# NATIONAL

## HANDBOOK

(REVISED EDITION)

BOISE PAYETTE LUMBER CO.

# NATIONAL HANDBOOK

*of*

## PLAN READING AND MATERIAL LISTING

*for*

**Lumber and Building Material Dealers, Contractors, Estimators and Designers**

*By*
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■ ■

*Containing*
USEFUL INFORMATION AND DATA PERTAINING ESPECIALLY TO FRAME DWELLING CONSTRUCTION

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# *PREFACE*

Lumber and building material dealers, contractors, estimators and designers alike, are required to prepare lists of the various materials entering into the construction of a building. Many are not sufficiently posted to make accurate lists in a practical way.

There are certain proved practical rules and suggestions that will greatly assist in taking off quantities. To apply these rules intelligently one needs a fair knowledge of simple arithmetic including decimals.

The purpose of this work is to provide the necessary data so that with its assistance anyone may become proficient in listing materials from plans. In making such lists it is particularly true that "practice makes perfect" and much practice makes for speed as well as accuracy.

No two listers working separately will arrive at exactly the same results. However, if both are following approved methods, the discrepancies should be negligible.

The methods described are those which have been evolved through a practical building experience of many years.

The chapters are arranged in the logical order in which the estimator should study them. As a reference work for those already familiar with the elements of plan reading and building construction, turn to Chapters 4 and 5.

# *CONTENTS*

CHAPTER 1.

# MENSURATION

Quantity listing is the science of determining from plans and specifications the quantites of the various kinds of materials that will be required to complete a structure. This requires a practical knowledge of the principles of mensuration. The following definitions and rules should furnish a satisfactory reference list for ordinary listing.

## DEFINITIONS

MENSURATION is that part of Geometry which treats of the measurement of lines, surfaces and solids.

A POINT indicates position only; it has neither length, breadth, nor thickness.

A STRAIGHT LINE is the shortest distance between two points.

AN ANGLE is the opening between two straight lines that meet in a point.

A CURVED LINE changes its direction at every point.

A BROKEN LINE is one made up wholly of straight lines lying in different directions.

PARALLEL LINES are straight lines that lie in the same plane and never meet.

A HORIZONTAL LINE is a line parallel to the surface of still water.

A VERTICAL LINE is a line perpendicular to a horizontal line.

A CIRCLE is a plane figure bounded by a curved line called the CIRCUMFERENCE, every point of which is equally distant from a point within, called the CENTER.

A DIAMETER of a circle is a straight line passing through the center and terminated at both ends by the circumference.

A RADIUS of a circle is a straight line drawn from the center to the circumference.

AN ARC of a circle is any part of its circumference.

A CHORD is a straight line joining the extremities of an arc.

A SEGMENT of a circle is the space included between an arc and its chord.

A SECTOR of a circle is the space included between an arc and two radii drawn to the extremities of the arc.

A POLYGON is a plane figure bounded by any number of straight lines.

A polygon of three sides is called a TRIANGLE; one of four sides, a QUADRILATERAL; one of five sides, a PENTAGON; one of six sides, a HEXAGON; one of seven sides, a HEPTAGON; one of eight sides, an OCTAGON; one of ten sides, a DECAGON; one of twelve sides, a DODECAGON.

A PARALLELOGRAM is a quadrilateral whose opposite sides are parallel.

A SQUARE is a quadrilateral having four equal sides and four equal angles.

AN ISOSCELES TRIANGLE is one having two of its sides equal.

AN EQUILATERAL TRIANGLE is one that has its three sides equal.

A RIGHT-ANGLED TRIANGLE is any triangle having one right angle. The side opposite the right angle is called the HYPOTENUSE; the other two sides of the triangle are called its LEGS.

THE BASE of any triangle is the side on which the triangle is supposed to stand.

THE ALTITUDE of any triangle is a line drawn from the vertex of the angle opposite the base, perpendicular to the base, or to the base extended.

A DIAGONAL is a straight line drawn from the vertex of any angle of a quadrilateral to the vertex of the angle opposite.

A PRISM, is a solid whose ends are equal parallel polygons and whose sides are parallelograms.

A CYLINDER is a solid whose ends are parallel and equal curved figures and whose cross-section is uniform throughout its length.

A PYRAMID is a solid whose base is a polygon and whose sides are triangles uniting at a common point called the VERTEX.

A CONE is a solid whose base is a circle and whose convex surface tapers uniformly to a point called the vertex.

A SPHERE is a solid bounded by a uniformly curved surface, every point of which is equally distant from a point within called the center.

The ratio of the circumference of a circle to its diameter is an incommensurable number, and is usually denoted by the Greek letter $\pi$, (*pi*). The approximate value of the ratio, correct to four decimal places, is 3.1416.

## RULES

CIRCLES:

Area = Square of Radius x 3.1416

Area = Square of Diameter x 0.7854

Area = Square of Circumference x 0.07958

Circumference = Diameter x 3.1416

Diameter = Twice the Radius

Diameter = Circumference x .31831

Diameter = Square root of area x 1.12838

Side of a square equal in area to circle = diameter x .8862

Side of an inscribed square = diameter x .7071

Diameter of a circle equal in area to square = Side of square x 1.128

Diameter of a circle for a given area = Square root of the area x 1.12838

Radius = Circumference x 0.159155

Radius = Square root of area x 0.56419

SPHERES:

Area of Convex Surface = Square of diameter x 3.1416

Diameter = Square root of surface area x 0.56419

Circumference = Cube root of solid content x 3.8978

Solid Content = Cube of diameter x .5236

Dimensions of an equal cube = diameter x .806

Length of an equal cylinder = diameter x .6667

ELIPSE:

Area = Transverse diameter x conjugal diameter x .7854

CONES AND PYRAMIDS:

Solid Content = Area of base x 1/3 altitude

CUBES:

Surface Area = 6 x area of one side

*To find the area of a sector,* divide the number of degrees in the arc of the sector by 360. Multiply the result by the area of the circle of which the sector is a part.

*To find the area of an irregular polygon,* divide the figure into triangles, parallelograms, etc. and find the area of each. The sum of these partial areas will be the area of the figure.

*To find the area of a regular polygon,* multiply the product of half the length of one side and the perpendicular distance from the center to one side by the number of sides.

*To find the area of a triangle,* multiply the base by the altitude and divide the product by 2.

*To find the volume of a right prism,* or cylinder, multiply the area of the base by the altitude.

*To find the volume of a pyramid or cone,* multiply the area of the base by one-third of the altitude.

*The square of the hypotenuse of a right triangle* equals the sum of the squares of the other two sides or legs.

*If the length of the hypotenuse and one leg of a right triangle is known,* the other side may be found by squaring the hypotenuse and squaring the leg, and extracting the square root of their difference.

CHAPTER 2.

# PLAN READING

## PLANS

Plans are the graphic presentation of the owner's ideas expressed by his architect to the builder. A set of ordinary house plans consist of a plan of the basement and each floor, drawn in the nature of a horizontal cross-section. These indicate the thickness and construction of walls, room sizes, size and swing-way of doors, size of windows, location of plumbing and electrical fixtures, cabinets, stairs, etc. The plans also include a "section" which gives story heights, jamb heights, size and spacing of studs, joists and rafters, and detail of main cornice. Usually four elevations are included in a set of plans, a front, two sides and a rear. These are to give information as to the exterior design of the building, windows, doors, kind of siding, ornamental detail, etc. Plans, in some cases may include one or more transverse and longitudinal sections as may be necessary to develop the design and give data not shown on floor plans or elevations.

It is impracticable to draw the plans of the building full size and they are therefore drawn proportionally smaller. This is done by making all the dimensions of the drawing a certain fraction of the true dimensions of the building. In the preparation of house plans the scale most generally used is ¼ inch to a foot. In larger buildings, ⅛ inch scale may be necessary. In making details a larger scale is used.

## SCALE RULE

In laying out and measuring plans a scale rule is used on which are engraved the graduations for the different scales. The marks are numbered in order from the ends; the space next to the end being subdivided into twelfths representing inches. There are two scales marked on each edge and in one the divisions are twice as long as in the other and numbered from the opposite end.

To measure a line, place the 0 mark on one end of the line. If the opposite end of the line falls exactly on one of the foot marks, the line is that number of feet in length. If the end of the line falls between two graduations, move the lowest of the two, to the end of the line; that will indicate the whole number of feet and the inches will be indicated on the fine graduations at the opposite end of the scale. Thus, if a line extends over 8 large spaces exactly, it is 8 feet long, but if it extends over 7 large spaces and 5 small ones, it is 7 feet 5 inches long. A little practice will enable one to use the scale with as much ease as an ordinary rule.

## DISCREPANCIES

In reading plans, discrepancies are sometimes found between figures and actual scale. This is because errors may creep into the drawings, and paper and tracing cloth are subject to expansion and contraction. In such a case the figures govern. Large scale drawings take precedence over small ones because of their greater accuracy. If discrepancies are noted where the intent of the designer is not readily apparent, he should be consulted.

## ABBREVIATIONS

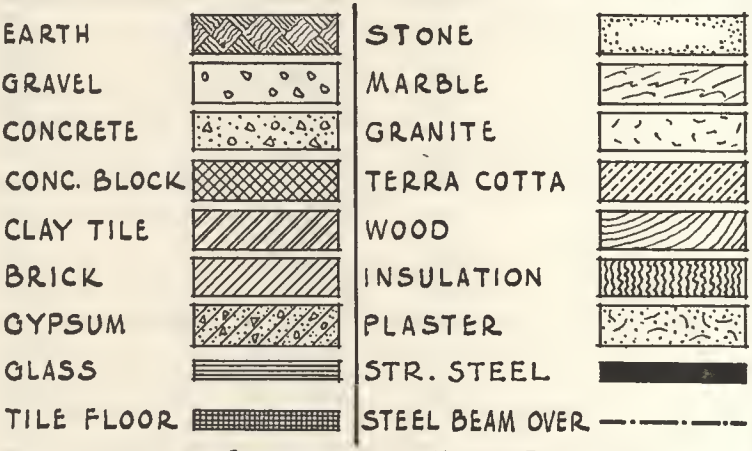
There is a lack of uniformity in abbreviations used by designers and listers. A list of usual abbreviations of the most common terms follows:

| | |
|---|---|
| Access Panel ..... A. P. | Cast Iron ..... C. I. |
| Antique Copper ..... A. C. | Catch Basin ..... C. B. |
| Basement ..... Bsmt. | Ceiling ..... Clg. |
| Brick Arch ..... B. A. | Cement ..... Cem. |
| Brick, Common ..... Brk. | Cement Block ..... Cem. Bl. |
| Brick, Face ..... F. Br. | Cement Plaster ..... Cem. Pl. |
| Brick, Glazed ..... Gl. Br. | Center Line ..... C. L. |
| Brick Mold ..... B. M. | Center to Center ..... C/C |
| By (as in 2 x 4) ..... x | Check Rail ..... Ck. Rl. |
| Cabinet ..... Cab. | Closet ..... Clos. or Clo. |
| Cap Mold ..... C. M. | Clothes Chute ..... C. C. |
| Cased Opening ..... C. O. | Column ..... Col. |
| Casement ..... Csmt. | Concrete ..... Conc. |

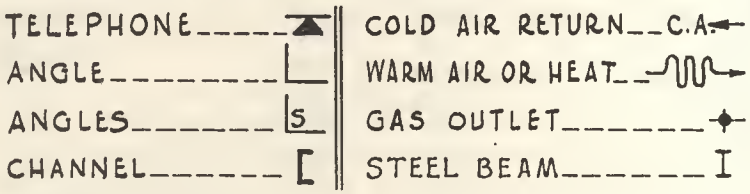
Conductor Pipe .....C. P.
Counter Flashing .....Ctr. Fl.
Crown Mold Cap .....C. M. C.
Cubic .....Cu.
Diameter .....Dia.
Ditto .....Do.
Divided .....Div.
Double Acting .....D. A.
Double Strength .....D. S.
Door .....Dr.
Down .....Dn.
Down Spout .....D. S.
Drawer .....Dwr.
Dressed and Matched .....D & M
Drip Cap .....D. C.
Electric Cabinet .....El. Cab.
Elevation .....Elev.
Equals .....=.
Feet .....' or Ft.
Finish .....Fin.
Fire Proof .....F. P.
Flashing .....Fl.
Floor .....Flr.
Floor Drain .....F. D.
Footing .....Ftg.
French Door .....Fr. Dr.
Fresh Air .....F. A.
Gallon .....Gal.
Galvanized .....Galv.
Galvanized Iron .....G. I.
Glass .....Gl.
Inches ....." or In.
Inside .....I. S.
Insulation .....Ins.
I Beam or Iron Beam .....I. B.
Ironing Board .....I. B.
Knocked Down .....K. D.
Lavatory .....Lav.
Lights .....Lts.
Lineal .....Lin.
Linoleum .....Lino.
Loose Pin .....L. P.
Lumber .....Lbr.
Matched and Beaded.....M. & B.
Medicine Cabinet .....M. C.
Metal Lath .....M. L.
Molding .....Mldg.
Mullion .....Mul.
Muntin .....Mun.
Nickel Plated .....N. P.
On Centers .....o/c or O. C.
One Thousand .....M.
Opening .....Opg.
Outside .....O. S.
Pair .....Pr.
Panel .....Pan.
Penny .....d.
Piece .....Pc.
Pint .....Pt.
Plain Rail .....Pl. Rl.
Plaster .....Pl.
Plaster Arch ....P. A. or Pl. Arch
Pockets and Pulleys .....P. & P.
Quadruple .....Quad.
Quart .....Qt.
Rabbeted .....Rab.
Radiator .....Rad.
Reinforced Concrete ....Re. Con.
Room .....Rm.
Sash Door .....Sh. Dr.
Screen .....Scr.
Segment .....Seg.
Single Strength .....S. S.
Soil Pipe or Stack Pipe .....S. P.
Standard Bearing Plate...S. B. P.
Surfaced Two Sides.....S 2 S
Surfaced 1 Side and 1 Edge...
.....S 1 S & E
Switch .....S
Telephone .....Tel.
Tongue and Groove .....T & G
Transom .....Tr.
Triple .....Trip.
Ventilator .....Vent.
Vertical .....Vert.
Vestibule .....Vest.
Wash Basin .....W. B.
Waste Pipe .....W. P.
Water Closet .....W. C.
Window .....Wnd.
Wrought Iron .....W. I.
Yards .....Yds.

# SYMBOLS

THE SYMBOLS AS LISTED BELOW ARE COMMONLY USED TO INDICATE VARIOUS STRUCTURAL MATERIALS




## SYMBOLS FREQUENTLY USED FOLLOW

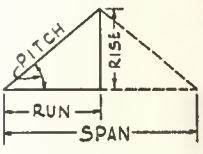



## ELECTRIC WIRING SYMBOLS

| SYMBOL | DESCRIPTION | SYMBOL | DESCRIPTION |
|---|---|---|---|
| ○ | CEILING OUTLET | S | SINGLE SWITCH |
| ⊢○ | WALL OUTLET | $S_3$ | THREE WAY SWITCH |
| ⊢⊖ | DUPLEX CONVENIENCE OUTLET | ▬ | LIGHTING PANEL |
| ⊢⊖WP | WEATHERPROOF CONV. OUTLET | ▭ | METER |
| Ⓐ | SPECIAL PURPOSE OUTLET | Ⓣ | TRANSFORMER |
| ⊙ | FLOOR OUTLET | ⊡ | PUSH BUTTON |
| Ⓒ | CLOCK OUTLET | ▭/ | BUZZER |
| Ⓓ | DROP CORD | ▭D | BELL |

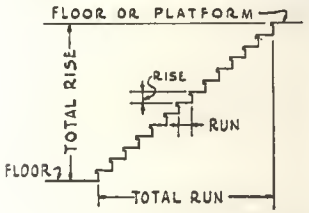
## PITCH, RISE AND RUN

**ROOF PITCH:**—In roof framing, angles are expressed by the "pitch" or by the "rise" and "run." The rise is the vertical height of the roof above the wall plates. The run is the horizontal distance from wall plate to ridge of roof. The pitch is the proportion that the rise bears to the span (not to the run). Thus, in a house 24 ft. wide, if the rise of the roof is 8 ft., the pitch is 8/24 or ⅓. This may also be expressed as 8″ rise and 12″ run.



ROOF PITCH

**STAIR RISE AND RUN:**—In stair building, the run is the horizontal distance from the face of the first riser to the face of the last riser or the width of one step from face to face of risers. The rise is the distance from floor to floor or from step to step.



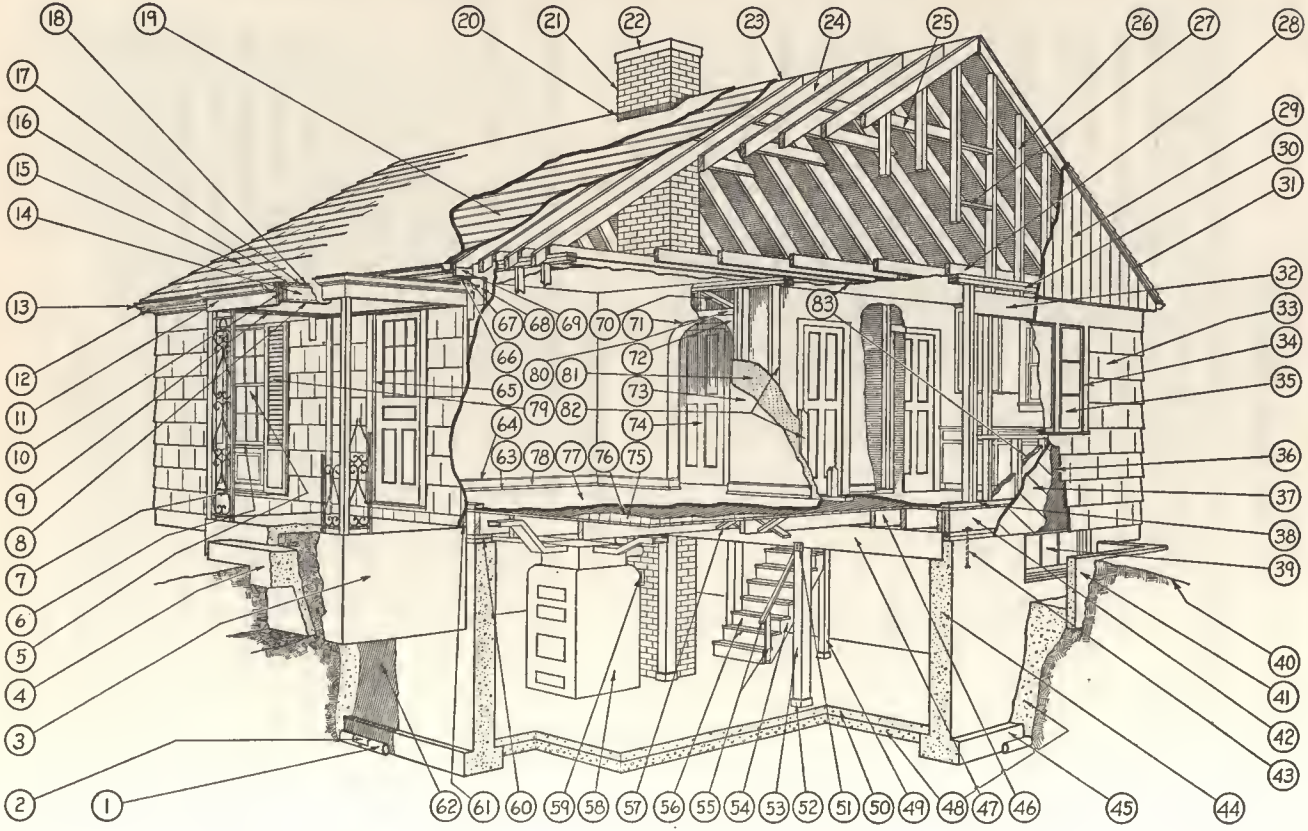
STAIR RISE AND RUN

## SPECIFICATIONS

Specifications are written to explain the plans and describe in detail, grades and makes of materials to be used and workmanship. They provide general conditions to govern the legal relations between architect, owner and builder; also matters of insurance, etc., and become a part of the contract for the work.

In some instances many usual and standard details are omitted from the plans and not mentioned in specifications. These constitute what are ordinarily considered as "reasonably implied" requirements. In this event the estimator should use his judgment in including the necessary materials to facilitate completion of this phase of the work. Frequently instead of figuring out certain details the specifications are so written that the responsibility for compliance with building laws rests upon the builder. In such cases the estimator must have some knowledge of building regulations in his community.

## SECTIONAL PERSPECTIVE OF A ONE STORY HOME *(See Index, Page 15)*



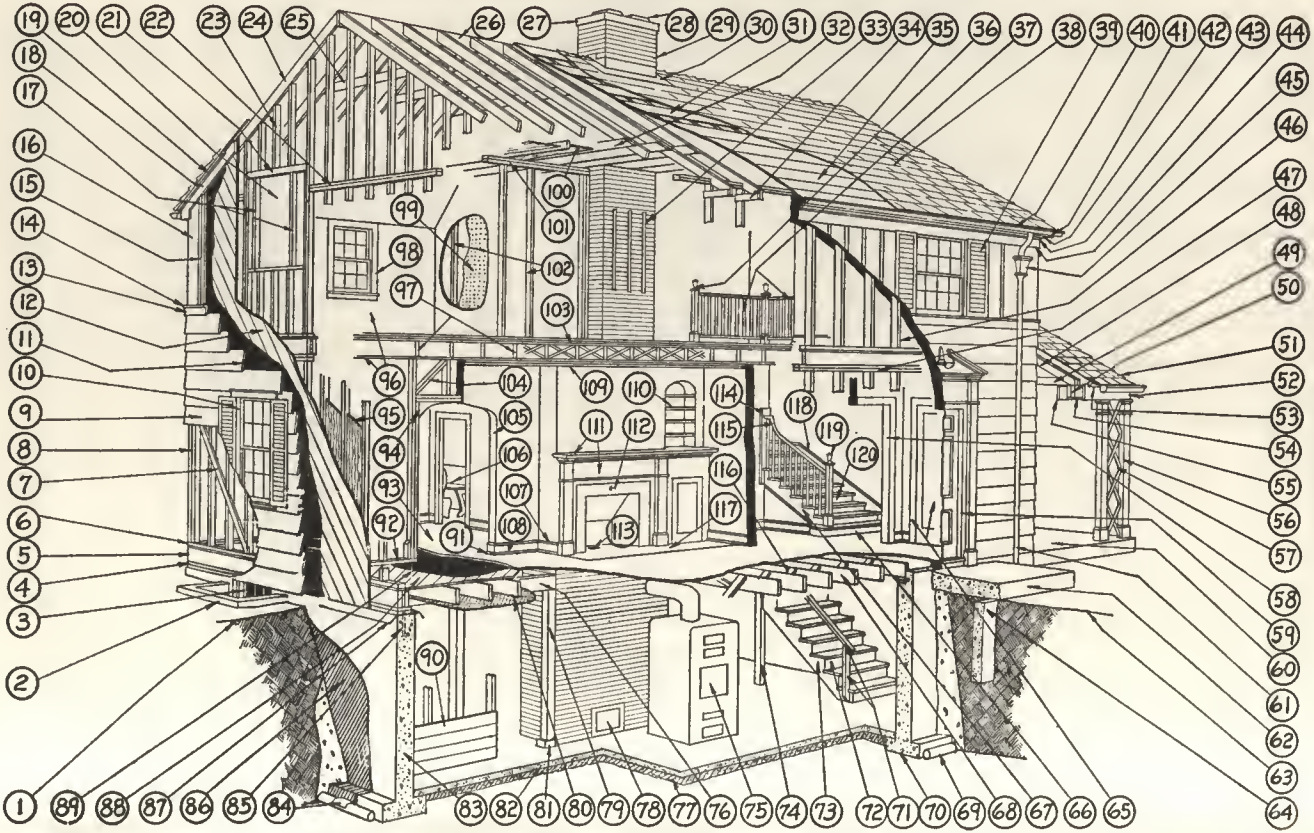
# INDEX TO ABOVE DRAWING

## ALPHABETICAL INDEX



## NUMERICAL INDEX

## SECTIONAL PERSPECTIVE OF A TWO STORY HOME *(See Index Page 17)*



# INDEX TO ABOVE DRAWING

## ALPHABETICAL INDEX



## NUMERICAL INDEX

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3. Cellar Sash
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120. Main Stair Treads and Risers

CHAPTER 3.

# DEFINITIONS OF BUILDING TERMS

ALCOVE:—A large recess adjoining a room usually accessible thru an arch or cased opening.

APPLIED MOLD:—A separate mold to be applied or attached.

APRON:—Something which by its shape or use suggests an apron, as: (a) The horizontal piece of wood trim, plain or molded, used to finish below the stool of a window. (b) A strip, usually of lead, attached to a wall to overlap the flashing and protect the joint. (c)A piece of board for conducting loose material past an opening.

ARCH:—Materials arranged in the form of a curve over an opening which holds its original shape, yet resists pressure.

AREA:—Same as Areaway.

ARCH CENTERS:—Substructures, usually of timber or planks, on which a masonry arch or vault is built and on which it rests until complete and therefore self-supporting.

AREAWAY:—An uncovered space next to the foundation walls of a building to give light or ventilation to the basement.

ASH DUMP:—A small cast iron frame with one or two counter-balanced cast iron leaves, used as a floor-door in a fireplace, through which the ashes fall to the ash-pit in the basement.

ASTRAGAL:—A molding attached to one of the swinging doors of a pair, against which the other strikes; sometimes used in the same way for sash. Astragals for sliding doors are designated "male" and "female"; one is placed on the door and one on the jamb of single doors, and one on the meeting edge of each door in a pair.

ATTIC:—The open space between ceiling joists and roof rafters.

BACK PUTTY:—Putty forced between the glass and the rabbet after the glass has been set to fill any possible openings.

BACK-UP STRIPS:—Strips nailed at angles of walls and partitions to make solid corners for nailing ends of lath.

BALCONY:—A projection from the face of a wall supported by brackets, trusses or columns and usually surrounded by a balustrade.

BALUSTER:—A small pillar or column supporting a rail.

BALUSTRADE:—A series of balusters connected by a rail.

BARGE BOARD:—Same as Verge Board.

BASE:—(a) The horizontal band of interior finish next to the floor. (b) The lower part of a complete architectural design, as of a column or piece of furniture.

BASE MOLDING:—A molding used to trim the upper edge of interior base boards.

BASE SHOE:—A molding used next to the floor on interior base boards.

BAT:—A part of a brick.

BATTEN:—Narrow strips of wood or metal placed over the joints of sheathing to keep out the weather.

BATTER:—A term used by brick-layers, carpenters, etc., to signify a wall, piece of timber, or other material, which does not stand upright but inclines from you when you stand before it; but when on the contrary it leans toward you, it is said to over-hang.

BAY:—A bay is properly called "bow" and is any projecting part of a building in the form of either an arc or polygon.

BAY-WINDOW:—A window placed in the bay or bow of a building.

BEAM:—A piece of timber, steel or other material, placed horizontally to support a load.

BEAM FILLING:—Masonry to fill up the spaces between joists.

BEARING:—The portion of a beam or other structural member that rests on the supports.

BEARING PARTITION:—A partition which supports any vertical load in addition to its own weight.

BEARING WALL:—A wall which supports any vertical load in addition to its own weight.

**BED IN PUTTY:**—To place putty in the rabbet of a sash before the glass is inserted.

**BETWEEN GLASS:**—The thickness of the member between two lights of glass.

**BLINDS:**—One or more light wooden sections in the form of doors to close over windows in order to shut out light, give protection or add temporary insulation; — frequently used for ornamental purposes only, in which case they are fastened rigidly to the building.

**BLIND TENONED:**—Any paneled assembly made with the tenons on the ends of the rails mortised into but extending only part way through the stile.

**BOND:**—The connection between the units of any masonry structure formed by lapping them upon one another in such a way as to break joints vertically and horizontally, and form an inseparable mass. In common brick walls every sixth course of bricks, called Headers, are laid cross-ways of the wall. In face brick various bonds are used, known as: Common, Header, Stretcher, English, Dutch, Flemish and Garden Wall.

**BOW-WINDOW:**—Same as Bay-Window.

**BOX SILL:**—A header nailed on the ends of joists and resting on the wall plate. Used in frame building construction.

**BRACE:**—An inclined piece of timber used in order to form a triangle and thereby stiffen a structure. A brace used to support a rafter is called a "strut."

**BRACKET:**—A general term for all projecting supports, whether wood, stone or other material; a triangular frame, or of some other form. Corbels are properly called brackets.

**BREAK:**—An interruption in the continuity of a member or surface, or a change of direction.

**BREAKING JOINT:**—The arrangement of building units so as not to allow joints to come immediately over each other.

**BRIDGING:**—The stiffening of floor joists and partition studs by cutting pieces in between. Where a double row of diagonal bracing in opposite directions is used in a joist span, it is called "cross-bridging."

**BUTT JOINT:**—Where the ends of two members or timbers meet in a square cut joint.

**BUTTRESS:**—Projecting masonry in the nature of a pilaster used for architectural effect or to strengthen a wall against the thrust of a roof or other pressure or strain.

**CAMBER:**—The convexity of a truss or beam in order to prevent its becoming concave by its own weight or by the burden it may have to sustain.

**CASED OPENING:**—An opening without doors finished with wood jambs and trim.

**CASEMENT:**—A swinging sash hung on its vertical edge, which does not reach to the floor.

**CHAIR RAIL:**—A horizontal wood molding on an interior wall to protect it from being damaged by the backs of chairs.

**CHECK RAILS:**—Meeting rails sufficiently thicker than the window to fill the opening between the top and bottom sash made by the parting stop in the frame. They are usually beveled. Hence the name "Check Rail Windows."

**CHIMNEY BREAST:**—The horizontal projection of a chimney from the wall in which it is built;—commonly applied to its projection on the inside of a building.

**CHIMNEY CAP:**—A coping of concrete, stone or terra cotta surmounting the brick work to protect the upper mortar joints from the weather.

**CHIMNEY POT:**—A cylindrical or prismoidal pipe of earthen ware, sheet metal, etc., placed at the top of a chimney as an ornament or to increase the draft.

**CLEAN-OUT DOOR:**—A cast iron door with frame, placed near the base of smoke flues and ash-pits to permit cleaning.

**CLEAT:**—A strip of wood, iron or other material fastened across something to give strength or hold in position.

**COAT:**—A layer of any substance covering another, as: one, two or three coats of paint, plaster, etc.

**COLLAR BEAM:**—A horizontal beam above the lower ends of the rafters.

**COLUMN:**—Any supporting pillar.

CONDUCTOR:—The sheet metal pipe that conducts the water away from the roof gutters.

CONDUCTOR HEAD:—Same as Leader Head.

CONDUIT:—A pipe through which electric wires are run for fire protection.

COPING:—(a) The capping or covering of a wall. (b) Where porches or other spaces are enclosed with solid walls to the height of the usual porch railing, the material that is used as a finish cap is termed a "coping."

CORBEL:—A short piece of stone, wood or other material, projecting from a wall to form a support; generally ornamented.

CORBELOUT:—To build out one or more courses of brick or stone from the face of a wall, to form a support.

CORNER BEAD:—(a) A strip of formed galvanized iron, sometimes combined with a strip of metal lath, placed on corners before plastering to reinforce them. (b) A strip of wood finish, three-quarter round or angular, placed over a plaster corner for protection.

CORNER BRACES:—Diagonal braces let into studs to reinforce corners of frame structures.

CORNER POST:—The two or three studs spiked together to form a corner in the frame of a building.

CORNICE:—(a) The horizontal members of trim which finish the over-hanging portion of a roof and form the connection between the roof and side-walls. (b) Interior trim of wood or plaster at the angle of side-walls and ceilings.

CURB STRING:—A three member assembly sometimes used in an open stair, consisting of one housed string and one face string surmounted with a shoe rail to receive balusters.

CURTAIN WALL:—A non-bearing wall between columns or piers which is not supported by girders or beams.

DECK:—A flat portion of a roof.

DEPRESSED PLASTER CEILING PANEL:—A sunken panel accomplished by furring down on the ceiling joists usually with 2 x 2 strips projecting approximately 18″ from the side-walls all the way around the room before the lathing is done.

DOME DAMPER:—A cast iron frame and damper placed immediately above the brick arch and at the bottom of the smoke chamber of the fireplace.

DOOR, BATTEN:—A door made of sheathing secured by strips of board put cross-ways.

DOOR, PANEL:—A door composed of stiles, rails and panels.

DOOR, SASH:—Same as panel door, except that the panels and rails or any part of them are replaced with one or more lights of glass.

DORMER:—A vertical window in a roof, together with the enclosing sections of vertical side-walls and the roof over same.

DOWEL:—(a) A wood or steel pin let into two pieces of material where they are joined together. (b) Wood or steel pins driven or set into a wall so that other material may be fastened to them.

DOWN SPOUT:—Same as Conductor.

DRESSED & MATCHED:—Boards or plank machined in such a manner that there is a groove on one edge and a corresponding tongue on the other.

DRIP:—(a) A member of a cornice or other horizontal exterior finish course which has a projection beyond the other parts for throwing off water. (b) A groove in the under side of a sill to cause the water to drop off on the outer edge instead of drawing back and running down the face of the building.

DWARF WALL:—A low wall not as high as the story of a building.

EAVES:—The margin or lower part of a roof projecting over the wall.

EYEBROW:—A low dormer in a roof over which the roof is carried in a wave line similar to the arch or ridge over the eye.

FACED WALL:—A wall in which the masonry facing and backing are so bonded as to exert common action under the load.

FACE MEASURE:—The measurement across the face of any wood part, exclusive of any solid mold or rabbet.

FACE PUTTY:—Putty formed in the angle of a sash after the glass has been laid in the rabbet.

FASCIA:—(a) A vertical member on the outside of a cornice against which the crown molding is placed. (b) A flat vertical member of an architectural order or building, like a band.

**FEATHER:**—The small strip of wood inserted in the grooved edges of two pieces of board or plank to make a joint.

**FILLET:**—A narrow vertical band frequently used to separate and combine casings, bands and moldings.

**FINIAL:**—The architectural ornament with which a spire or ridge terminates.

**FINISHED SIZE:**—The measurement of any wood part over all, including the solid mold or rabbet.

**FIRE-STOP:**—A block of wood or other material placed between joists or in walls to obstruct the spread of fire.

**FIRE DIVISION WALL:**—A wall which subdivides a fire resistive building to restrict the spread of fire, but is not necessarily continuous through all stories nor extended through the roof.

**FIRE-WALL:**—A wall which subdivides a building to restrict the spread of fire by starting at the foundation and extending continuously through all stories to and above the roof.

**FLAGS:**—Flat stones from one to four inches thick, used for rustic walks, steps, floors, etc.

**FLASHING:**—Pieces of sheet metal so let into the wall as to lay over a roof, gutter, etc.

**FLOATING:**—Equal spreading of plaster on the surfaces of walls by means of a tool called a float; only rough plaster is floated.

**FLOATING PARTITION:**—One which rests on a floor between two joists parallel to them.

**FLOOR LINING:**—A layer of paper, felt or similar material placed between the blind floor and finish floor. Sometimes used erroneously to designate blind floor.

**FLUE LINING:**—Fire clay or terra cotta pipe, round or square, usually made in all of the ordinary flue sizes and in two-foot lengths; used for the inner lining of chimneys, the brick being placed around the outside. Fire clay flue lining is superior to terra cotta.

**FLUSH MOLD:**—An applied molding which finishes flush with, or below, the face or surface of the stiles or rails.

**FOOTING:**—The spreading course or courses at the base and upon which a wall rests; usually constructed of concrete.

**FOUNDATION:**—The entire masonry sub-structure below the first story floor or frame of a building, including the footing upon which the building rests.

**FRAME:**—(a) The enclosing woodwork of windows, doors, etc. (b) The skeleton structure of a wooden building.

**FRAMING:**—The rough timber work of a house including the blind floor, roof and structural members of partitions and ceilings.

**FRENCH DOOR:**—Single door or group of doors fully glazed and reaching to the floor.

**FRIEZE:**—(a) The horizontal member of a cornice set vertically against the wall. (b) Any carved or ornamented band in a building.

**FURRING:**—Strips of wood or metal applied to a wall or other surface to even it, form an air space or give a thicker appearance.

**GABLE:**—The vertical triangular portion of the end of a building from the level of the plates to the ridge of the roof. Also a similar end when not triangular in shape as of a gambrel roof or the like.

**GABLE END:**—An end-wall having a gable.

**GARMENT HANGER RODS:**—Rods placed in closets or wardrobes on which garment hangers are placed.

**GIRDER:**—Same as Beam. Where beams of different sizes are used in the same structure, the main beams only are termed girders.

**GIRT:**—One of the horizontal members in the frame of a building or other structure, located between the sill and the plate, to which vertical sheathing or other covering is attached.

**GIRTH:**—A term used to designate the lateral dimension of cornice work moldings, gutters, columns, etc.

**GRADE:**—Degree of height; level.

**GRADE LINE:**—The level of the ground at the building.

**GROUND COURSE:**—A horizontal course, usually of masonry, next to the ground.

**GROUNDS:**—Strips of wood of same thickness as lath and plaster which are attached to walls before the plastering is done. Used around windows, doors and other openings as a plaster stop and in other places for attaching base boards or other trim.

GUTTER:—A trough, usually of sheet metal or wood, at the eaves of a roof for conveying away the rain.

HEADER:—(a) One or more pieces of lumber used to support free ends of floor joists or to support the free ends of short joists, studs or rafters and transfer their load to other parallel joists, studs or rafters; usually the same size material as the joists, studs or rafters in which it is used. (b) A wood lintel. (c) In masonry, stones or bricks extending over the thickness of a wall, or the end of a brick showing on the face of a wall in horizontal position.

HEARTH:—The floor of a fireplace.

HEEL:—The end or foot of a rafter that rests upon the wall plate.

HIP:—The external angle formed by the meeting of two sloping sides of a roof.

HIP ROLL:—An ornamental strip of sheet metal, composition roofing, tile or wood to finish and cover a hip.

HOOK STRIP:—A horizontal band of interior wood finish to which metal clothes hooks are attached. Usually used in closets.

INCLOSURE WALL:—An exterior, non-bearing wall in skeleton construction anchored to columns, piers or floors, but not necessarily built between columns or piers.

JAMBS:—The upright sides and horizontal head of window and door frames.

JOIST:—Any of the plank or small iron or steel beams ranged parallel-wise from wall to wall in a building, or resting on beams or girders to support a floor or roof.

LANDING:—A platform on a flight of stairs.

LANDING TREAD:—A strip of same kind of wood and of same thickness as stair treads about 4″ wide, rabbeted on one side to the thickness of the finished floor and nosed on face edge same as treads. Used as finished edge on stair platforms and around stair wells.

LATH:—A strip of wood used for plaster base or under various roof coverings.

LATTICE:—Any work of wood or metal made by crossing wood strips, rods or bars and forming a network.

LEADER:—Same as Conductor.

LEADER HEAD:—An ornamental enlargement at the top of a leader or conductor to receive rain water in large volume at a narrow opening where a gutter is not practical.

LEDGER BOARD:—(a) A horizontal board fastened across the uprights of a scaffold parallel to the face of the building. A ribbon is sometimes called a Ledger Board. (b) A horizontal board forming the top rail of a simple fence, the hand rail to a balustrade, or the like.

LINTEL:—A horizontal structural member of wood, reinforced concrete, steel or other material which supports the load above an opening.

LOOK-OUT:—A short wooden bracket or cantilever to support an over-hanging portion of a roof or the like, which usually conceals it from view.

LUGS:—An extension of the stiles of a window beyond the meeting rails. Lugs are usually sawed ornamentally on the inside of the stile.

MASONRY:—Stone, brick, concrete, hollow tile, concrete block, gypsum block or other similar building units or materials or a combination of same, bonded together with mortar to form a wall, pier, buttress or similar mass.

MEMBERS:—The different parts of a structure, cornice, base, etc.

MITER JOINT:—A joint on a line bisecting the angle of junction.

MOCK RAFTER:—A short piece of timber used in the construction of an open cornice to imitate a real rafter; usually sawed ornamentally.

MORTISE:—A slot cut into a board, plank or timber, usually edgewise, to receive a tenon on another board, plank or timber to form a joint.

MULLION:—An upright or vertical bar, usually wider than the ordinary bar, dividing the glass in a sash or a wide upright bar dividing two sash in a frame. Applies also to upright bars in doors.

MUNNION:—Same as Mullion.

MUNTIN:—Applies to any short or light bar, either vertical or horizontal, in a sash or door, between glass or panels and not extending the full width or length of the sash or door.

NEAT:—Referring to plaster, means unsanded.

NEWEL:—A post to receive the end of a railing or balustrade.

NON-BEARING WALL:—A wall which supports no load other than its own weight.

OFF-SET:—Same as Break.

ORIEL WINDOW:—A projecting angular window commonly of a triagonal or pentagonal form and divided by mullions and transoms in different bays, etc. Any projection for a window above the first floor is often termed an Oriel Window.

OUTSIDE OPENING:—The measurement of any given article from outside to outside. Frame openings should be given in feet and inches.

PANEL:—A thin board having all its edges inserted in a groove of a surrounding frame.

PANEL STRIP:—A strip of material, plain or ornamented, attached to a surface to form panels.

PANEL WALL:—A non-bearing wall in skeleton construction, built between columns or piers and wholly supported at each story.

PARAPET:—The continuation of a wall above the roof line.

PARTY WALL:—A wall used or adapted for joint service between two buildings.

PEDESTAL:—The square support of a column.

PIERS:—(a) The solid parts of a wall between openings. (b) Masses of masonry supporting gates, arches, posts, girders, etc.

PILASTER:—A flat square column attached to a wall projecting about one-third of its width or less. When semi-cylindrical in form, it is also called a pilaster.

PILE:—A large stake or trunk of a tree driven into soft ground for the support of a structure.

PITCH:—The incline or rise of a roof. Pitch is expressed in inches of rise per foot "of run" or by the ratio of the rise to the span.

**PLAIN RAIL:**—Meeting rails of the same thickness as balance of the window.

**PLANCIER:**—The horizontal member of a cornice extending from the frieze to the fascia under the lookouts or rafter ends.

**PLASTER ARCH:**—An untrimmed plastered opening.

**PLASTER BASE:**—Any material on which plaster is to be applied, such as wood lath, metal lath, woven wire fabric, plaster board, etc.

**PLASTER CEILING PANEL:**—A section of a ceiling which is made to appear depressed or raised by furring on the joists before the lathing is done.

**PLASTER COVE:**—A cove usually between a side-wall and ceiling constructed by nailing rough-sawn cove brackets against each stud and the corresponding ceiling joist. Lathing is continuous from the side-wall onto the ceiling. Such coves are most commonly on a 15″ radius.

**PLASTER WAINSCOT CAP:**—A band of interior wood trim which covers a horizontal plaster joint; usually where the plaster wainscoting and float finish meet in kitchen and bath rooms. Sometimes erroneously referred to as chair rail.

**PLATES:**—Horizontal pieces of plank laid on a wall or spiked on the top or bottom of studding.

**PLINTH:**—(a) A block of interior wood finish thicker than the other trim, against which the base board ends at door openings. Side door casings continue upward from the top of a plinth block. (b) The square block at the base of a column or pedestal.

**PLUMB:**—Perpendicular.

**PLY:**—Used to denote the number of thicknesses of roofing-felt, veneer, etc.

**PORCH:**—A covered entrance to a building open except on the attached side.

**PORCH COPING:**—Same as Coping, (b) definition.

**POST:**—A structural member which is set vertically.

**PURLIN:**—A piece of timber across which rafters lie to prevent them from sinking.

PUTLOGS:—The horizontal cross-pieces on which scaffold planks rest, one end bearing on the ledger board and the other end secured to the face of the building.

RABBET:—A rectangular longitudinal groove cut in the corner of a board or other piece of material.

RAFTER:—Any of the inclined joists to which the roof boards are nailed.

RAFTER, COMMON:—One which reaches from wall plate to ridge.

RAFTER, DOUBLE JACK:—One which reaches from a valley to a hip.

RAFTER, HIP:—One which forms the intersection of an external roof angle.

RAFTER, JACK:—One which reaches from the wall plate to a hip or from a valley to a ridge.

RAFTER, VALLEY:—One which forms the intersection of an internal roof angle.

RAIL:—The cross or horizontal pieces of the framework of a sash, door, blind or any paneled assembly.

RAISED MOLD:—An applied molding which partly covers or which extends above the face or surface of the stiles or rails.

RAKE:—That part of a cornice which inclines.

REINFORCING:—Steel rods or fabric placed in concrete slabs, beams or columns to increase their strength.

RETURN:—Continuation of a molding or projection in another direction.

RIBBON:—A narrow board let into the studding to add support to joists. A ribbon is sometimes called a Ledger Board.

RIDGE:—The highest horizontal line of a roof.

RIDGE BOARDS:—Two narrow boards nailed along the ridge of a roof for finish when other ridge roll is not used.

RIDGE POLE:—The highest horizontal member in a roof extending from top to top of the pairs or rafters.

RIDGE ROLL:—An ornamental strip of sheet metal, composition roofing, tile or wood to finish and cover a ridge.

RIPPING SIZE: The width of stock necessary to produce any given finished size; usually ¼″ over finished size.

RISE:—The perpendicular height of a roof ridge above the wall plates or of a step or flight of steps.

RISER:—The vertical board under the tread in stairs.

ROOF SHEATHING:—The boards nailed to the roof rafters on which the shingles or other roof covering is laid.

ROOF TIES:—Boards or planks spanning the walls at the plate line, set at regular intervals (but not as close as ceiling joists) to prevent the walls from spreading due to the thrust of a roof.

ROUGH SILL:—The short plate or header that forms the base of a rough opening for a window in a frame wall.

ROWLOCK:—The end of a brick showing on the face of a wall in vertical position.

RUN:—The horizontal distance from the face of a wall to the ridge of the roof or the net width of a step or the horizontal distance covered by a flight of steps.

SADDLE:—The construction of any portion of a roof or other surface in a manner suggesting or corresponding in position to a saddle.

SASH:—A single wood frame containing one or more lights of glass.

SCAFFOLDING:—Same as staging.

SCRATCH COAT:—The first coat of plaster which is scratched to form a bond for the second coat.

SHAKES:—A handsplit shingle or imitation thereof.

SHEATHING:—The first covering of boards on the outside wall of a frame building. Roof boards are called "roof sheathing."

SHINGLES:—Thin slabs of wood cut with the grain to various standard lengths and tapered from a thick butt to a thin end. Used for covering roofs or sidewalls.

SHOE:—A small molding placed next to the floor on base boards.

SHUTTERS:—Same as blinds.

SIDING:—The finished covering of the outside wall of a frame building, whether made of weather-boards, vertical boards with battens, shingles or the like.

**SILLS:**—(a) Timbers, laid on the base or on a foundation wall, which support the frame superstructure. (b) A piece of material same size as studding which is nailed to the sub floor on which the studding of walls and partitions are erected, in some cases also designated as stud plates. (c) The pieces of wood, stone, brick or concrete at the bottom of windows and doors.

**SKIRTING:**—The horizontal belt of trim and finish located immediately above the foundation.

**SLEEPER:**—A piece of timber laid on the ground or strips bedded in concrete to receive wood flooring.

**SLIP NEWEL:**—A three sided newel which fits on the free end of a partition.

**SOFFIT:**—The under side of the subordinate parts and members of buildings, such as stair cases, archways, cornices, or the like.

**SOLDIER:**—The side or face of a brick showing on the face of a wall in vertical position.

**SOLID MOLD:**—A mold which is worked on the article itself.

**SOLID STUCK:**—Same as Solid Mold.

**SPAN:**—The distance between the supports of a beam, girder, arch, truss, etc.

**SPANDREL:**—That section of an outside wall between the head of one opening and the bottom of another opening in the next story. Any section of finished woodwork or the ornamentation placed between porch columns directly under the beam soffit.

**SPLAYED:**—The jamb of a door or anything else of which one side makes an oblique angle with the other.

**STACK PARTITION:**—A partition which carries the stack or soil pipe; usually constructed with 2 x 6 or 2 x 8 studs. The studs should be continuous from first floor to attic floor lines.

**STAGING:**—A structure of posts and boards for supporting workmen and material during construction.

**STAIR CARRIAGE:**—A stringer for steps or stairs.

**STILES:**—The upright or vertical outside pieces of a sash, door or blind.

STOOP:—Any outside platform or porch at an entrance.

STRETCHER:—A brick or stone or other unit of masonry laid lengthwise in a wall.

STRINGER:—(a) A longitudinal support for treads of a stair. (b) Timbers or other supports for cross members.

STRUT:—A structural member designed to resist pressure or compressive stress in the direction of its length.

STUDS:—Small timbers set vertically to which plaster base or sheathing is nailed to form frame walls or partitions.

SUB-FLOOR:—Matched lumber or boards laid on joists over which a finished floor is to be laid.

SURFACE:—To make plane and smooth.

TAILPIECE:—A relatively shorter beam, joist or rafter supported in a wall on one end and by a header on the other.

TENON:—That portion of the end of a board, plank or timber which is reduced in thickness so that it may be inserted in a corresponding slot, called a mortise, cut into another piece of board, plank or timber to form a joint.

TERMITE SHIELDS:—Strips of non-corrodible metal placed on the top of foundation walls and piers to repel termites.

THRESHOLD:—A strip of wood or metal beveled on each edge used above the finish floor under doors, usually under outside doors.

THROUGH TENONED:—A joint made with tenons on the end of the rails mortised or tenoned through and showing on the outside of the stile.

TONGUE AND GROOVE:—Same as Dressed and Matched.

TRANSOM:—A sash above a door, window or other sash.

TRANSOM BAR:—The horizontal division between a door, window or sash and the transom.

TREAD:—The upper horizontal part of a step on which the foot is placed.

TRELLIS:—Lattice work for vines to run on.

TRIMMER:—A beam or joist that receives the end of a header.

TROWEL:—To smooth, dress, shape, mix or apply with a trowel.

TRUSSING:—(a) Material used as lintels, headers and bracing over wide openings in frame buildings. (b) Any material used to form a truss.

VALLEY:—The internal angle formed by the meeting of two sloping sides of a roof.

VENEERED WALL:—A wall having a masonry facing which is not bonded to the backing to form an integral part of the wall for purposes of load bearing and stability.

VERANDA:—Same as Porch.

VERGE BOARD:—The board under the verge of gables; sometimes paneled or molded.

WAINSCOTING:—Finish material for covering interior walls.

WALL MOLDING:—A molded strip usually narrower than what is termed a panel strip.

WATER BOX:—Same as Leader Head.

WATER TABLE:—A horizontal beveled projection to throw off water; usually the first course above grade. In frame construction it is placed immediately above the skirting.

WEATHER BOARDING:—(a) Boards lapped over each other to prevent rain, etc., from passing through. (b) Beveled or any ordinary siding.

WELL HOLE:—The open space in a floor to accommodate a stair case.

WELL HOLE PARTITION:—A partition built through a well-hole about which the stair turns.

WINDOW:—Two sash (upper and lower) which are fitted to fill an opening.

CHAPTER 4

# LISTING MATERIALS

Listing materials is the practical application of mensuration. Observation of actual construction will increase the proficiency of the lister. Such observation will aid a student-lister to acquire first hand information, experience and judgment, which when applied with the information contained herein, will enable him to make a comprehensive list.

## APPROXIMATE ESTIMATING

A tentative estimate of the completed cost of a structure is often requested. This is most easily obtained by cubing; i.e., the cubic contents of the proposed building is figured at the current average price per cubic foot for buildings of the same class (see illustrations, Page 102). Make up cubic foot costs according to local experience. Obtain the cubic contents and actual cost of recently completed buildings. Schedule these and keep them for reference, revising them as conditions warrant. Refer to Page 103.

If a break-down of the approximate estimate is required, refer to Page 104.

## EXACT ESTIMATING

Exact estimating can only be done by listing and pricing all materials and gathering together all sub-bids and miscellaneous costs. Competent plans and specifications, from which quantities and quality of materials may be obtained, are a necessity.

COMPUTING WASTE:—The actual quantity of brick for a superficial foot of wall depends upon the thickness of the mortar joint and the size of the brick. The tables for computing brick work, mortar and other masonry materials not only give the actual quantities of brick but also allow for waste of such materials as lime, sand, cement, etc. Refer to Chapter 5, Tables No. 1 to 13 inclusive, pages 105 to 113.

Observation, judgment and a simple knowledge of mathematics are all that is required to determine waste in figuring quantities. For example, hardwood flooring is laid over a solid surface without openings. The feetage is figured on a basis of 3″ strips. The finished flooring, however, is 2¼ inches. The difference is ¾ of an inch. ¾ of an inch is ⅓ of the finished width of the flooring. Therefore, figure the actual area to be covered and add ⅓ for waste or for the number of feet board measure required.

In computing the quantities of manufactured lumber an allowance for waste in cutting and sawing has been figured. To save time for the estimator, tables have been compiled for arriving at the exact amounts of flooring, siding, shingles and other materials. Refer to "CHECK LIST INSTRUCTIONS."

# CHECK LIST

In computing lists of materials a check list is a necessity. It guides the estimator in the same logical order in listing every job until that order becomes a habit which will serve in reducing omissions to a minimum. The one that follows is correct for the principal items which enter into the construction of an ordinary dwelling. There are, however, many sundry items which must be gleaned from the specifications or from special details on the plans.

Before starting a material list, the specifications should be read. Note carefully the paragraphs under subheadings with which the list is principally concerned.

Indicate the catalog or stock number of items of millwork not covered by the specifications.

There are 171 items in the list followed by instructions, tables, etc., bearing numbers corresponding to the check list. To save time estimating forms which correspond to this check list may be used.

## LUMBER

1. Sills, Wall Plates, End Bridging.
2. Girder Posts.
3. Girders and Ledgers.
4. Floor Joists.
5. Ceiling Joists.
6. Headers and Trimmers.
7. Exterior Studs.
8. Interior Studs.
9. Plates, Girts, Etc.
10. Lintels.
11. Rafters.
12. Rafter Bracing.
13. Ribbons and Backing.
14. Bridging.
15. Lookouts.
16. Furring.
17. Grounds.
18. Roof Sheathing.
19. Sheathing for Exterior Walls.
20. Sub-Flooring.
21. Finish Flooring.
22. Siding.
23. Wall Shingles.
24. Roof Shingles, Roofing, Etc.
25. Interior Finish Lumber.
26. Exterior Finish Lumber.
27. Scaffolding, Shoring and Arch Centers.
28. Miscellaneous Framing.
29. Deadening.
30. Insulation.
31. Wallboard.
32. Plywood.

## BUILDING PAPER

33. Floor Lining.
34. Sheathing Paper.
35. Miscellaneous Building Paper.

Check List (Continued)

## MILLWORK

36. Exterior Lineal Trim.
37. Exterior Millwork.
38. Window and Sash Frames.
39. Louvres.
40. Exterior Door Frames.
41. Plaster Cove Brackets.
42. Plaster Arch Brackets.
43. Windows and Sash.
44. Screens.
45. Storm Sash.
46. Combination Doors.
47. Doors.
48. Jambs.
49. Window and Sash Trim.
50. Door Trim.
51. Interior Lineal Trim.
52. Wainscoting and Paneling.
53. Closet Shelves.
54. Garment Hanger Rods.
55. Ceiling Beams.
56. Cabinets.
57. Stairs.
58. Miscellaneous Millwork.

## MASONRY

59. Excavating.
60. Concrete Foundations.
61. Rough Stonework.
62. Concrete Blocks.
63. Waterproofing.
64. Drain Tile.
65. Cement Floors, Steps, Etc.
66. Brickwork.
67. Chimneys and Fireplace.
68. Structural Tile.
69. Flag Stone.
70. Cut Stone.
71. Structural Steel.
72. Reinforcing.

## STEEL SASH, COAL CHUTES, ETC.

73. Cellar Sash and Frames.
74. Casement Sash and Frames.
75. Coal Window.
76. Coal Chute.
77. Steel Areaway Walls.

## ORNAMENTAL IRON

78. Chimney Anchors.
79. Ornamental Iron Stairway.
80. Railings.
81. Iron Grills.
82. Grates and Area Guards.
83. Brackets.
84. Window Guards.
85. Miscellaneous.

## PLASTERING AND STUCCO

86. Plaster Base.
87. Corner Lath.
88. Corner Beads.
89. Plaster.
90. Sand.
91. Precast Members.
92. Color.
93. Stucco Base.
94. Stucco.
95. Stucco Color.

Check List (Continued)

## HARDWARE

96. Nails.
97. Anchors.
98. Joist Hangers.
99. Sash Weights.
100. Sash Cord.
101. Strap Hinges.
102. T Hinges.
103. Safety Hinge Hasps.
104. Metal Post Caps.
105. Hardware Cloth.
106. Truss Rods.
107. Splice Plates.
108. Bolts.
109. Cellar Sash Sets.
110. Attic or Garage Sash Sets.
111. Butts.
112. Show Case Hinges.
113. Butt Plates.
114. Double Acting Door Sets.
115. Door Lock Sets.
116. Blind Hinges and Fasteners.
117. Mortise Door Bolts.
118. Flush Bolts.
119. Spring Bolts.
120. Door Checks.
121. Chain Door Fasteners.
122. Transom Hardware.
123. Sash Locks and Lifts.
124. Casement Sash Hardware.
125. Drawer Pulls.
126. Cupboard Turns.
127. Elbow Catches.
128. Cabinet Door Knobs.
129. Drawer Knobs.
130. Friction Bolts.
131. Base Knobs.
132. Stop Screws and Washers.
133. Hand Rail Brackets.
134. Clothes Hooks and Hangers.
135. Closet Pole Ferrules.
136. Mail Box.
137. House Numbers.
138. Screen and Storm Door Sets.
139. Screen and Storm Sash Hangers.
140. Siding Corners.
141. Clothes Line Hooks.
142. Garage Door Hardware.
143. Metal Thresholds.
144. Sundry Hardware.

## SHEET METAL

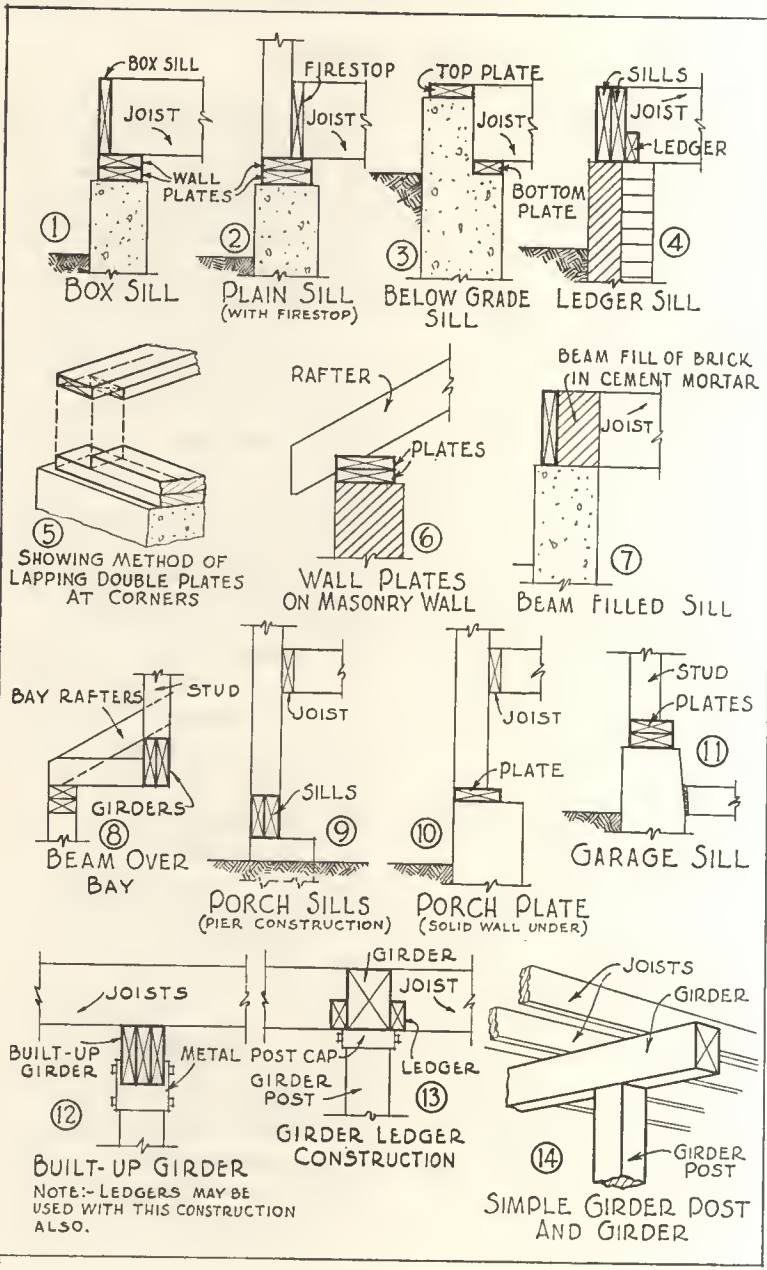
145. Metal Roofing.
146. Ridge Roll.
147. Tin Shingles.
148. Valley Tin.
149. Gutter.
150. Conductor Pipe.
151. Vent Stacks.
152. Flower Box Lining.
153. Clothes Chute Lining.
154. Ventilators.
155. Termite Shields.

## PAINT

156. Exterior Body Paint.
157. Shingle Stain.
158. Exterior Trim Paint.
159. Sheet Metal Paint.
160. Mineral Paint.
161. Floor Varnish or Paint.
162. Interior Varnish, Paint, Enamel, Etc.
163. Radiator Paint.
164. Glazing.

## ROOFING

165. Asphalt Shingles.
166. Canvas Decking.
167. Built-Up Roofing.
168. Prepared Roofing.
169. Asbestos Shingles.
170. Slate Roofing.
171. Tile Roofing.


BOX SILL
JOIST
WALL PLATES
①
BOX SILL
FIRESTOP
JOIST
②
PLAIN SILL
(WITH FIRESTOP)
TOP PLATE
JOIST
BOTTOM PLATE
③
BELOW GRADE SILL
SILLS
JOIST
LEDGER
④
LEDGER SILL
⑤
SHOWING METHOD OF LAPPING DOUBLE PLATES AT CORNERS
RAFTER
PLATES
⑥
WALL PLATES ON MASONRY WALL
BEAM FILL OF BRICK (IN CEMENT MORTAR
JOIST
⑦
BEAM FILLED SILL
BAY RAFTERS
STUD
GIRDERS
⑧
BEAM OVER BAY
JOIST
SILLS
⑨
PORCH SILLS
(PIER CONSTRUCTION)
JOIST
PLATE
⑩
PORCH PLATE
(SOLID WALL UNDER)
STUD
PLATES
⑪
GARAGE SILL
JOISTS
BUILT-UP GIRDER
⑫
BUILT-UP GIRDER
NOTE:- LEDGERS MAY BE USED WITH THIS CONSTRUCTION ALSO.
GIRDER
JOIST
METAL POST CAP
LEDGER
GIRDER POST
⑬
GIRDER LEDGER CONSTRUCTION
JOISTS
GIRDER
⑭
GIRDER POST
SIMPLE GIRDER POST AND GIRDER

# CHECK LIST INSTRUCTIONS
# LUMBER

The following instructions are made up principally for standard framing 16″ on centers. No special data is given for taking off material for porches, dormers, bays and other sundry items, as the methods employed in each instance are identical with those used for listing similar quantities on the building proper. Be sure that all sizes of materials listed are same as sizes indicated on plan. Grade, quality and kind of lumber should be listed to conform to specifications.

## 1. SILLS AND WALL PLATES.

Measure the lineal feet of foundation or masonry walls on which sills, wall plates or sill ledgers are shown; divide into practical stock lengths and list in pieces. When double wall plates are shown on plan, double the quantity.

BOX SILLS:—Where box sills are shown on plans, compute in same manner as wall plates. Where sills rest on piers, joints should break on piers only. Refer to Page 40, Figure 1.

END BRIDGING:—Material same size as second floor joists; measure length of outside walls where ends of joists rest and divide into practical stock lengths and list in pieces. Refer to Page 42, Figure 17a.

## 2. GIRDER POSTS.

List number indicated; length equal to height of basement ceiling minus depth of girder. Where girder ledger construction is used, the length of post is equal to ceiling height. Refer to Page 40, Figure 13.

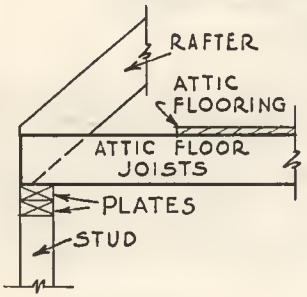
PORCH POSTS:—Compute the number of posts required to support porch girders or joists and list in proper lengths for cutting.

## 3. GIRDERS AND LEDGERS.

List basement girders in one piece or break on center of support. When ledgers are shown on plans, list pieces of stock length required. Refer to Page 40, Figures 4 and 13.

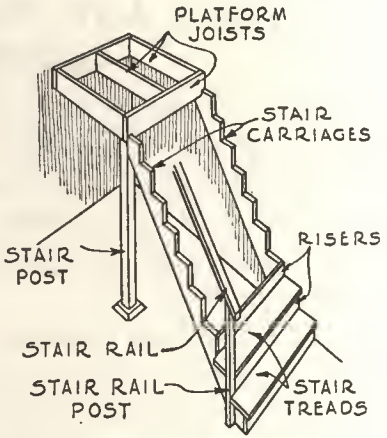
PORCH GIRDERS:—List pieces of stock length required for supporting porch joists.

BEAM OVER BAY:—List pieces of stock lengths for supporting walls above bay openings. List lengths to assure sufficient bearing at supports.



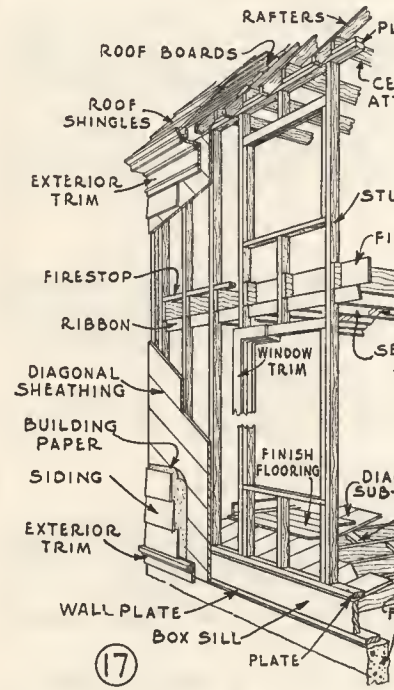

FRAMING AT CORNICE

(15)

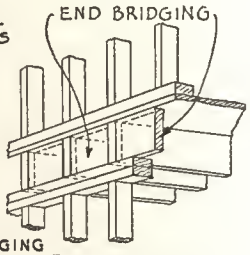



STAIR FRAMING

(16)

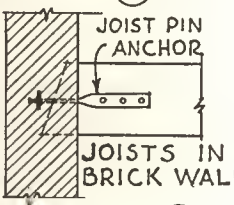



(17)




END BRIDGING AT SECOND FLOOR

(17A)




JOISTS IN BRICK WALL

(18)

LOCATION OF FRAMING MEMBERS

## 4. FLOOR JOISTS.

FIRST FLOOR:—Where practical joists should be in one piece. Quantity required, 16″ o.c., is equal to ¾ the number of feet in run, plus 1. Quantity required, 24″ o.c., is equal to ½ the number of feet in run, plus 1. To these add the quantity required for doubling and tripling under partitions which run the same way as joists. If joists are in more than one piece, allow 12″ for lap.

SECOND FLOOR:—Compute same as first floor with length determined by closest bearings.

ATTIC JOISTS:—Compute same as second floor joists.

ROOF JOISTS:—Compute same as second floor joists.

BAY JOISTS:—Measure lineal feet, same size as floor joists and list in pieces of stock length.

LANDINGS:—Usually 2 x 6 with headers of same size. In extreme cases where additional headroom or clearance is necessary, 2 x 4's may be used. List pieces of stock length.

STAIR CARRIAGES:—Stair carriages are usually figured when building basement, attic, porch or outside stairs on the job. The lengths vary according to the ceiling heights, rise and run. Carefully examine the plan to determine the proper lengths. Refer to Page 42, Figure 16.

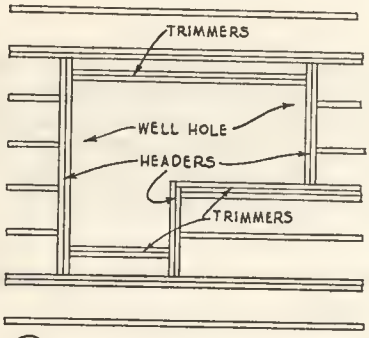
PORCH JOISTS:—Length of porch joists is determined by the length of the porch and location of girder or intermediate supports. List headers if shown. If joists are in more than one piece, allow 12″ for lap.

## 5. CEILING JOISTS.

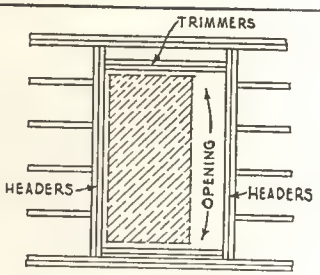
MAIN BUILDING:—Size as indicated on plan. Number required 16″ o.c. is equal to ¾ the number of feet in run, plus 1. For 24″ o.c., ½ the number of feet in run, plus 1. List in stock lengths. Add for headers and trimmers for ceiling openings.

BAYS, DORMERS AND PORCHES:—Usually 2 x 4 unless span exceeds 10′ in which case they should be 2 x 6.

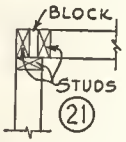
GARAGE:—Use size and lengths indicated on plan. List in pieces of stock lengths.

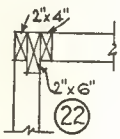


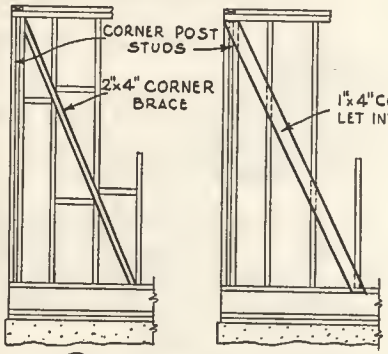

(19) FRAMING STAIR WELL



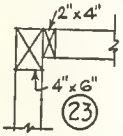

(20) FRAMING AROUND CHIMNEY OR FIREPLACE



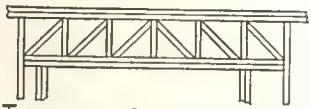



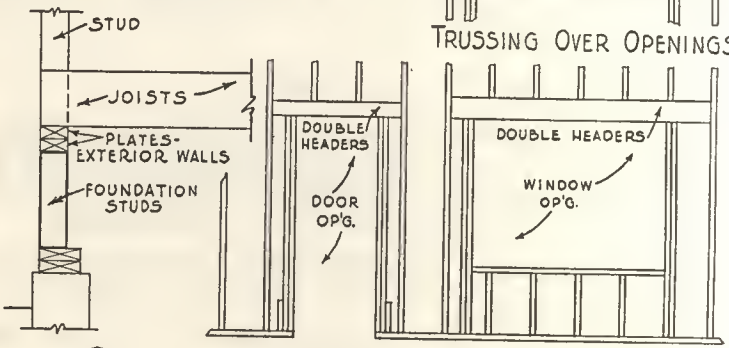

(24) CORNER BRACES (25)




CORNER POST
VARIOUS CONSTRUCTION METHODS



TRUSSING OVER OPENINGS




(26) (27) HEADERS OVER OPENINGS

## 6. HEADERS AND TRIMMERS.

Joists received by a wall to have header of same dimension nailed across their free ends. Joists cut for well holes, chimneys, etc., to have double headers of same dimension.

If required by the specifications, list material same size as floor joists for header blocking to be set 16″ on centers between each pair of joists which may support a floating partition.

## 7. EXTERIOR STUDS.

Size as indicated on plan and for 16″ o.c. same number as there are feet in the perimeter of the building; for 24″ o.c. number required is equal to ¾ the number of feet in the perimeter of the building. In either case add 2 studs for each exposed corner and 1 stud for each outside door or window opening. The total quantities include necessary doubling.

The number of studs for a gable will be ½ the number of feet in the span. The length will be the gable height.

Examine plans for miscellaneous studs, such as used for built up porch rails, column cores, etc. and list same in suitable stock lengths.

CORNER BRACES:—Examine plans for same and list in pieces of proper stock lengths. Refer to Page 44, Figures 24 and 25.

HEADERS:—For outside openings it is safe to list the following:

For spans up to 3′ 6″, two 2 x 4's on edge.
For spans up to 4′ 6″, two 2 x 6's on edge.
For spans up to 6′ 0″, two 2 x 8's on edge.
For spans up to 7′ 6″, two 2 x 10's on edge.

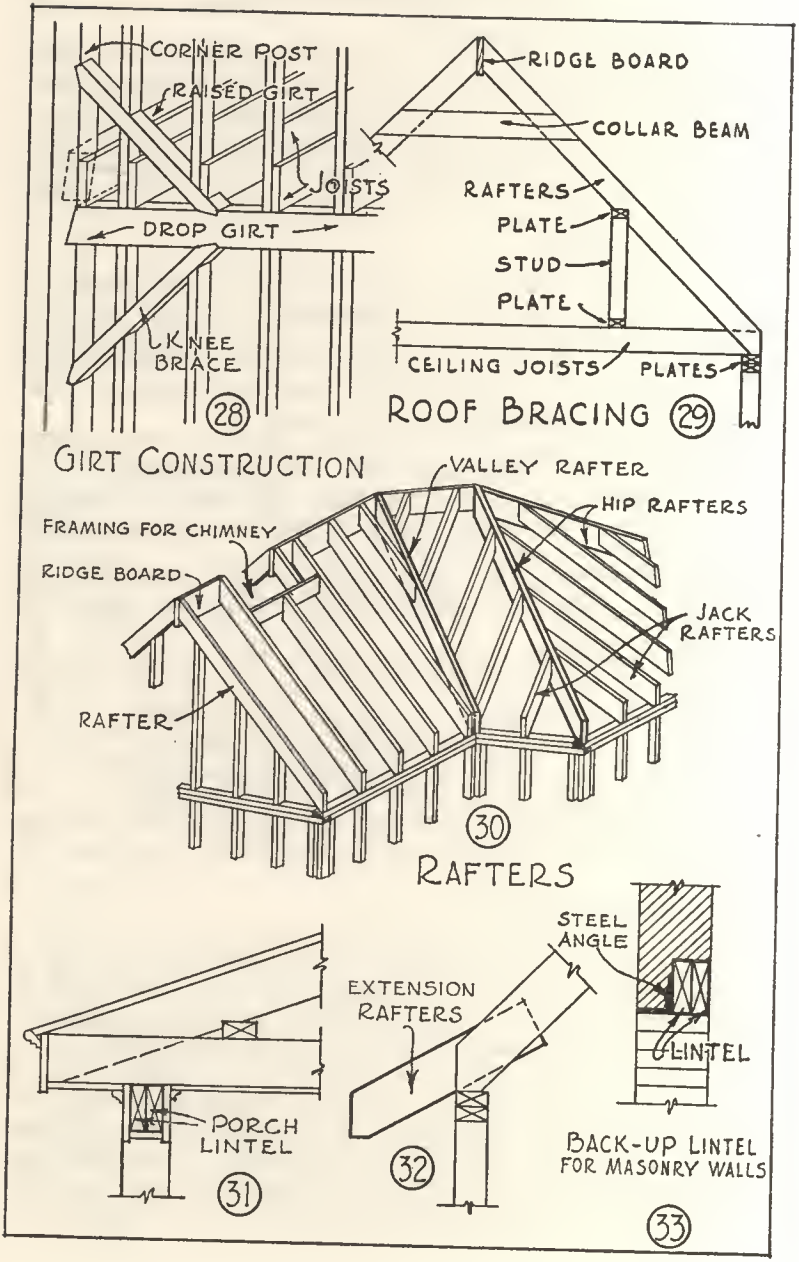
Allow for bearing at each end. In lieu of headers for spans over 5′0″, truss construction is preferred, Refer to Page 44, Figure 27.

## 8. INTERIOR STUDS.

The sum of the lengths of all partitions in feet is the number of studs required, 16″ o.c.; for 24″ o.c. number required is ¾ of above. Add 1 stud for each inside opening. The length is determined by the height of ceiling. Size of studs in partitions through which soil pipes are run should be at least 2 x 6″.

## 9. PLATES, GIRTS, ETC.

EXTERIOR WALLS:—Number of plates shown on cross section drawing times the perimeter of building will give the total lineal feet of outside stud plates required. To this add the lineal feet of plates required for dormers, bays and porches. List in pieces of practical lengths. Refer to Page 42, Figures 15 and 17.


CORNER POST
RAISED GIRT
JOISTS
DROP GIRT
KNEE BRACE
28
GIRT CONSTRUCTION
RIDGE BOARD
COLLAR BEAM
RAFTERS
PLATE
STUD
PLATE
CEILING JOISTS
PLATES
ROOF BRACING 29
VALLEY RAFTER
HIP RAFTERS
FRAMING FOR CHIMNEY
RIDGE BOARD
JACK RAFTERS
RAFTER
30
RAFTERS
STEEL ANGLE
EXTENSION RAFTERS
LINTEL
PORCH LINTEL
31
32
BACK-UP LINTEL FOR MASONRY WALLS
33

INTERIOR WALLS:—Three times the total number of interior studs is number of lineal feet of plates required. List in pieces of practical lengths.

GIRTS:—If plans show girt construction, list in pieces of practical lengths. Refer to Page 46, Figure 28.

FIRESTOPS:—Examine plans for firestops and list the necessary material in pieces of practical lengths. Refer to Page 40, Figure 2, and Page 42, Figure 17.

**10. LINTELS.**

BACK-UP LINTELS FOR MASONRY WALLS:—To allow for bearing the length of the lintel is usually one foot more than the width of the opening. The lintels may be built up of 2″ plank or may be solid timber. Refer to Page 46, Figure 33.

PORCHES:—Usually 2 pieces of 2″ plank with end beams of same size. Should be one piece wherever possible or break on porch columns. List in pieces of stock lengths. Refer to Page 46, Figure 31.

**11. RAFTERS.**

Number required for each roof slope, if 16″ on centers, ¾ of run in feet, plus 1; if 18″ on centers, ⅔ of run in feet, plus 1; if 20″ on centers, ⅝ of run in feet, plus 1; if 24″ on centers, ½ of run in feet, plus 1.

Except in the case of intricate roof framing all rafters should be reduced to the number of pieces required of the length of a common rafter. Jack rafters can be cut most economically from this length material.

If *hip and valley rafter* sizes are not indicated in specifications, list them 2″ deeper than common rafters.

To find the length of common. hip or valley rafters, refer to Page 126, Table No. 20. Also see drawing on Page 127.

Unless otherwise specified, short rafters for bays and dormers and often for porches may be 2 x 4.

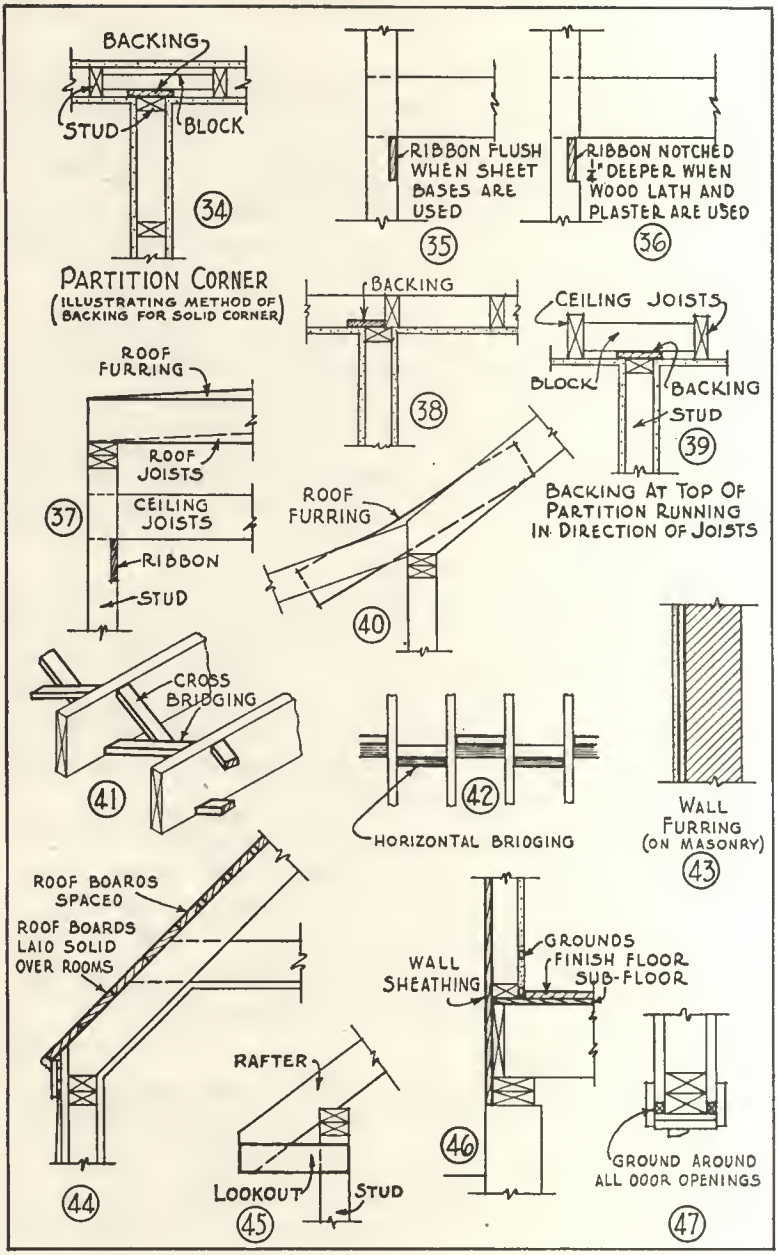
Unless otherwise specified, *extension rafters* should be same size material as other rafters. Refer to Page 46, Figure 32.

**12. RAFTER BRACING.**

Measure lineal feet of *ridge board* of size shown on plan. Divide into practical lengths and list in pieces. Refer to Page 46, Figures 29 and 30.

List any other rafter bracing shown on plan or specified, including purlin studs and plates and all members of trusses.

Scale length of *collar beams* on plan, and figure quantities according to spacing designated. Refer to Page 46, Figure 29.


BACKING
STUD
BLOCK
34
PARTITION CORNER
(ILLUSTRATING METHOD OF BACKING FOR SOLID CORNER)
RIBBON FLUSH WHEN SHEET BASES ARE USED
35
RIBBON NOTCHED ½" DEEPER WHEN WOOD LATH AND PLASTER ARE USED
36
BACKING
38
CEILING JOISTS
BLOCK
BACKING
STUD
39
BACKING AT TOP OF PARTITION RUNNING IN DIRECTION OF JOISTS
ROOF FURRING
ROOF JOISTS
CEILING JOISTS
RIBBON
STUD
37
ROOF FURRING
40
CROSS BRIDGING
41
42
HORIZONTAL BRIDGING
WALL FURRING (ON MASONRY)
43
ROOF BOARDS SPACED
ROOF BOARDS LAID SOLID OVER ROOMS
44
RAFTER
LOOKOUT
STUD
45
WALL SHEATHING
GROUNDS
FINISH FLOOR
SUB-FLOOR
46
GROUND AROUND ALL DOOR OPENINGS
47

**13. RIBBONS AND BACKING.**

To find lineal feet required, take the sum of joist runs on each exterior wall where joist ends are spiked against studding. Allow for joints on studs only.

Back-up strips may be of 1 x 3 material where projection on one side of studding only is required and 1 x 6 material where projection on both sides of studding is required. List sufficient lineal feet to make solid corners at all interior angles for lathing. Refer to Page 48, Figures 34, 35, 36, 37, 38 and 39.

**14. BRIDGING.**

CROSS:—Figure 1 row of bridging for joists spanning over 8 ft. and up to 16 ft. Figure 2 rows of bridging for joists spanning over 16 ft. To find the number of lineal feet required for a row of bridging, take 3 times the length of the run. Refer to Page 48, Figure 41.

HORIZONTAL:—List same number of lineal feet as walls or partitions which are to receive it, multiplied by the number of courses specified. Use material same size as studs. Refer to Page 48, Figure 42.

**15. LOOKOUTS.**

List stock lengths of material required to cut number shown on plan. Refer to Page 48, Figure 45.

**16. FURRING.**

List number of lineal feet of size required for masonry walls, floors, ceilings and roofs as may be specified. Refer to Page 48, Figures 40 and 43.

**17. GROUNDS.**

Grounds should be ⅞" wide and thickness of lath and plaster. Estimate a single strip around openings that receive trim and two rows for base. Refer to Page 48, Figures 46 and 47.

**18. ROOF SHEATHING.**

First figure actual roof surface to cover. Then add or deduct as follows:

| | |
|---|---|
| 1 x 6—10" o.c. | (Wood Shingles 5" Exposure) Deduct 30% |
| 1 x 4— 5" o.c. | (Wood Shingles 5" Exposure) Deduct 10% |
| 1 x 4—4½" o.c. | (Wood Shingles 4½" Exposure) = Actual Surface |
| 1 x 3—3¾" o.c. | (Wood Shingles 3¾" Exposure) Deduct 1/6 |
| 1 x 6—Laid Close | (Wood Shingles or other roofing) Add 10% |
| 1 x 6—D & M | (Wood Shingles or other roofing) Add 1/5 |

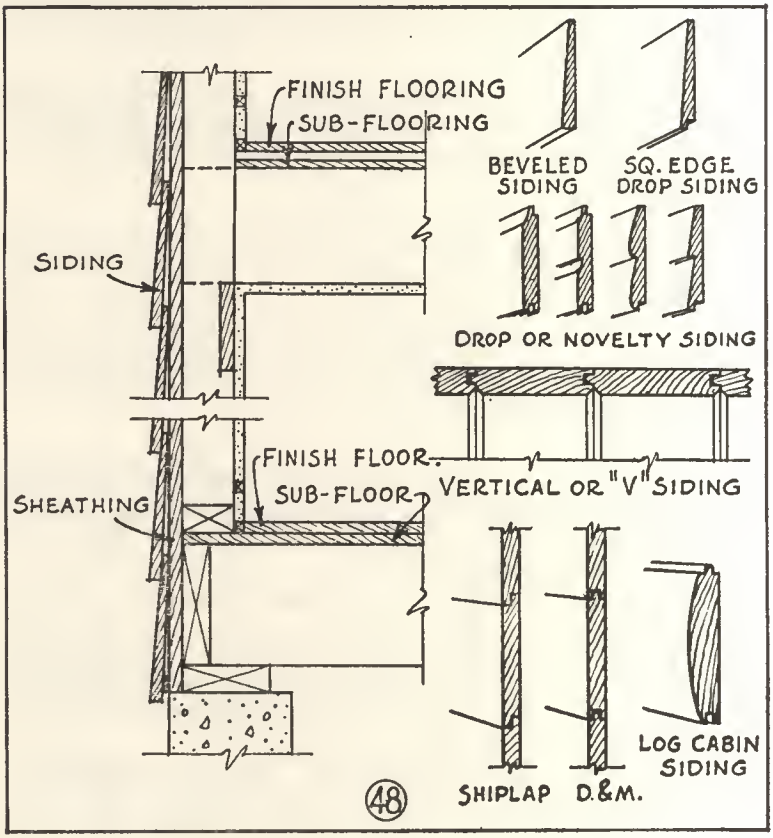
Refer to Page 127, Table No. 21 and alternate methods illustrated by drawings on Page 128.

## 19. SHEATHING FOR EXTERIOR WALLS.

Compute solid area of exterior walls to be sheathed; deduct 15 sq. ft. for each O.S. door and 10 sq. ft. for each window. For either shiplap or D & M add 1/5 if laid horizontally or add ¼ if laid diagonally.

## 20. SUB-FLOORING.

To the actual area to be covered by 1x6 S2S, add 1/6; D & M add 1/5; 1x6 S2S laid diagonally add 1/5; 1x6 D & M laid diagonally add ¼.



## 21. FINISH FLOORING.

To the area to be covered by hardwood flooring, add the following percentages for quantity required.

| Width of Flooring | Thickness | | |
|---|---|---|---|
| | ¾" or 13/16" | ⅜" | ½" |
| 1½" Face | 50⅓% | 33⅓% | 33⅓% |
| 2" Face | 37½% | 25% | 25% |
| 2¼" Face | 33⅓% | ..... | ..... |
| 3¼" Face | 25% | ..... | ..... |

To find amount of 4" flooring, add ¼ to the area to be covered; 6" flooring add 1/5. If 1⅛" flooring is used add an extra ¼. Porch floor should be laid in one-piece lengths. Hence the lengths of porch flooring should be specified. If 2x6 D&M flooring is used double the area to be covered and add 1/5.

## 22. SIDING.

BEVELED SIDING:—Compute the exact surface in feet, deducting window openings, door openings, chimney surface and other surfaces not to be covered; add as per following table.

| Kind of Siding | Exposure | Add to Actual Surface |
|---|---|---|
| 4" | 2½" | 7/10 |
| 5" | 3½" | 1/2 |
| 6" | 4½" | 2/5 |
| 8" | 6¼" | 3/10 |
| 8" | 6½" | 1/4 |
| 10" | 8" | 3/10 |
| 10" | 8¼" | 1/4 |
| 10" | 8½" | 1/5 |
| 12" | 10" | 1/4 |

DROP SIDING:—Figure surface in same manner; add as follows:
1 x 6—Add 1/4; 1 x 8—Add 1/5; 1 x 10—Add 1/6.
Log cabin siding; compute same as drop siding and double the quantity.

VERTICAL SIDING:—Compute the surface area to be covered (deduct for openings same as bevelled siding) and add 1/4 for 6" widths; 1/5 for 8" widths; 1/6 for 10" widths. List in feet board measure and specify lengths. Vertical siding should be used in one piece lengths where possible to avoid any horizontal joints.

## 23. WALL SHINGLES.

Compute the exact surface, deducting window openings, door openings, chimney openings and other surfaces not to be covered. List shingles in number of squares, size and exposure. To save time in computing shingles required to cover wall areas, use the following table. To obtain squares of wall shingles required multiply actual area in square feet to be covered by factor given in the following table for exposure and size specified.

| Exposure | Actual Wall Area | 16" Shingle Factors | 18" Shingle Factors | 24" Shingle Factors |
|---|---|---|---|---|
| 5" | sq. ft. x | .0133 | | |
| 5½" | sq. ft. x | .01212 | | |
| 6" | sq. ft. x | .0111 | .0124 | .0167 |
| 6½" | sq. ft. x | .0103 | .0115 | .0148 |
| 7" | sq. ft. x | .00952 | .0108 | .0139 |
| 7½" | sq. ft. x | .00889 | .0098 | .0133 |
| 8" | sq. ft. x | | .0093 | .0126 |
| 8½" | sq. ft. x | | .0088 | .0119 |
| 9" | sq. ft. x | | | .0111 |
| 9½" | sq. ft. x | | | .0106 |
| 10" | sq. ft. x | | | .0101 |

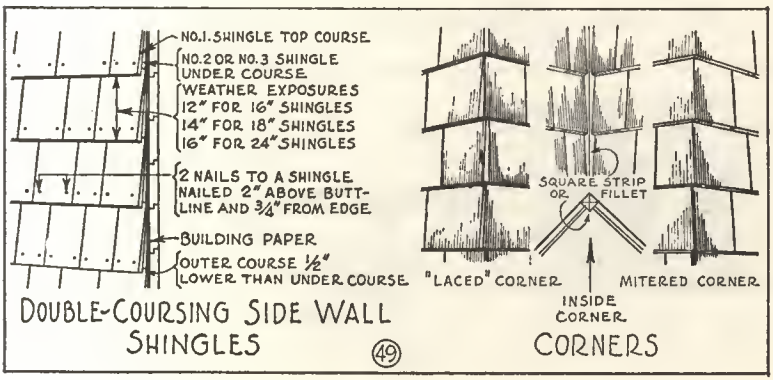
Example:—Assume area of wall to be covered is 1220 sq. ft. and that 18" shingles are to be used with 7" exposures. Then 1220 x .0108 = 13.176 squares or 13⅓ squares. Wall shingles are packed THREE bundles to a square. If quantity is wanted in bundles, multiply squares by 3. When shingles are laid with tight joints instead of open joints, an additional 3% should be added to the total number of shingles required.

WALL SHINGLES LAID DOUBLE COURSE:—Compute surface to be covered as for single course. To obtain squares of wall shingles required, multiply actual area in square feet to be covered by factor given in the following table for exposure and size specified.

One half of the squares obtained will be No. 2 or No. 3

shingles for concealed courses and the other half will be the number of squares required for outer courses.

| Exposure | Actual Wall Area | 16" Shingle Factors | 18" Shingle Factors | 24" Shingle Factors |
|---|---|---|---|---|
| 8" | sq. ft. x | .0167 | | |
| 8½" | sq. ft. x | .0157 | | |
| 9" | sq. ft. x | .01481 | | |
| 9½" | sq. ft. x | .01403 | | |
| 10" | sq. ft. x | .01333 | .0148 | |
| 10½" | sq. ft. x | .0127 | .0142 | |
| 11" | sq. ft. x | .01212 | .0133 | |
| 11½" | sq. ft. x | .0116 | .0128 | |
| 12" | sq. ft. x | .0111 | .0123 | .0167 |
| 12½" | sq. ft. x | | .0117 | .0161 |
| 13" | sq. ft. x | | .0113 | .0155 |
| 13½" | sq. ft. x | | .01093 | .0148 |
| 14" | sq. ft. x | | .0106 | .0143 |
| 14½" | sq. ft. x | | | .0139 |
| 15" | sq. ft. x | | | .0133 |
| 15½" | sq. ft. x | | | .0129 |
| 16" | sq. ft. x | | | .0126 |




DOUBLE-COURSING SIDE WALL SHINGLES

49

CORNERS

## 24. ROOF SHINGLES.

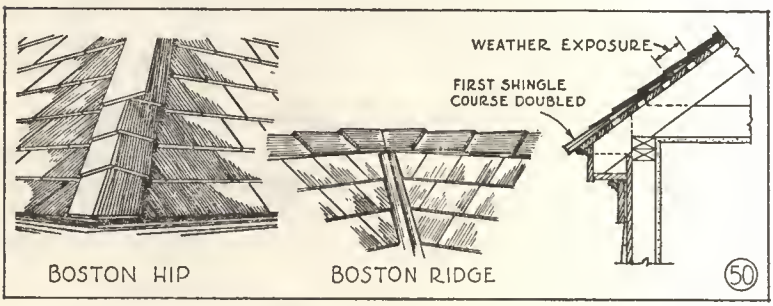
Compute exact roof surface to be shingled. List shingles in number of squares, size and exposure. Wood shingles for roofs are packed FOUR bundles to a square. To figure squares of roof shingles required, multiply actual roof area in square feet by factor given in the following table for exposure and size specified.

| Exposure | Actual Roof Area | 16" Shingle Factors | 18" Shingle Factors | 24" Shingle Factors |
|---|---|---|---|---|
| 3½" | sq. ft. x | .0143 | | |
| 3¾" | sq. ft. x | .0133 | | |
| 4" | sq. ft. x | .0125 | .0143 | |
| 4½" | sq. ft. x | .0111 | .0125 | |
| 5" | sq. ft. x | .01 | .0111 | |
| 5½" | sq. ft. x | | .01 | |
| 6" | sq. ft. x | | | .0125 |
| 6½" | sq. ft. x | | | .0111 |
| 7" | sq. ft. x | | | .01053 |
| 7½" | sq. ft. x | | | .01 |

Refer to Page 127, Table No. 21 and drawings on Page 128.

For information regarding shingles see Red Cedar Shingle Bureau Handbook.

For other roofing refer to Pages 100 and 101.



## 25. INTERIOR FINISH LUMBER.

SOILED CLOTHES BIN:—List 120 lineal feet of 1 x 2 S4S and 1 stock board of proper size to make the bottom of the soiled clothes bin.

SHELVING:—All clothes closets should be provided with shelving. List number of stock boards required as indicated on plans.

To correctly figure shelving for other purposes (attic, basement or storage) a drawing should be provided showing space and location, height, width, depth and number of shelves required. Sizes of supporting members should be taken from drawing.

BASEMENT PARTITION SHEATHING:—To find amount required for sheathing basement partitions, multiply the lineal feet of partitions by 8 ft. for height (in the case of all basements that are from 6 ft. to 7 ft. 6 in.) and add ¼ if 1 x 4 D & M is used and 1/5 if 1 x 6 D & M is used. Allow nothing for openings.

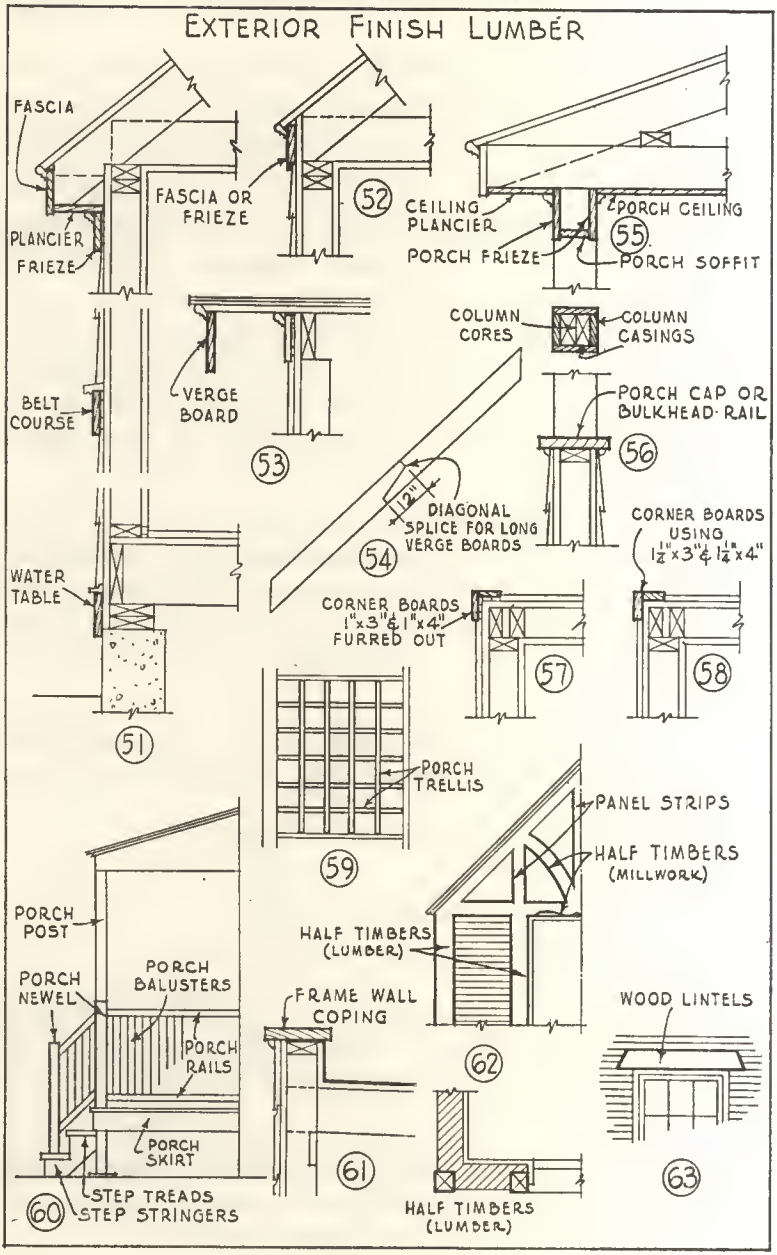
RED CEDAR CLOSET LINING:—For amount required, add to the square feet of surface to be covered, the following percentages:

| | |
|---|---|
| 3/8 x 1½″ | 33⅓% |
| 3/8 x 2″ | 25% |
| 3/8 x 2½″ | 20% |
| 3/8 x 3¼″ | 23% |

13/16 figured same as oak flooring

CELLAR STAIR:—List pieces of stock size material such as treads, risers, wall strings, rails, posts, trim, etc. required to construct stairs as specified, unless same is mill made. Refer to Page 42, Figure 16.

ATTIC STAIR:—List pieces of stock size material such as treads, risers, wall strings, rails, posts, trim, etc. required to construct stairs as specified, unless same is millwork.


EXTERIOR FINISH LUMBER
FASCIA
PLANCIER
FRIEZE
FASCIA OR FRIEZE
52
CEILING PLANCIER
PORCH FRIEZE
PORCH CEILING
55
PORCH SOFFIT
COLUMN CORES
COLUMN CASINGS
BELT COURSE
VERGE BOARD
53
PORCH CAP OR BULKHEAD RAIL
56
12"
DIAGONAL SPLICE FOR LONG VERGE BOARDS
54
CORNER BOARDS USING 1"x3" & 1"x4"
WATER TABLE
CORNER BOARDS 1"x3" & 1"x4" FURRED OUT
57
58
51
PORCH TRELLIS
59
PANEL STRIPS
HALF TIMBERS (MILLWORK)
PORCH POST
PORCH NEWEL
PORCH BALUSTERS
PORCH RAILS
PORCH SKIRT
STEP TREADS
STEP STRINGERS
60
HALF TIMBERS (LUMBER)
FRAME WALL COPING
62
WOOD LINTELS
61
63
HALF TIMBERS (LUMBER)

## 26. EXTERIOR FINISH LUMBER.

Finish lumber should be listed in pieces where practical.

FASCIAS, PLANCIERS, FRIEZE, BELT COURSE, SKIRTING, WATER TABLE AND TRELLIS:—Measure actual lineal feet from plan, add 10% for waste and list in ft. board measure. When planciers of beaded ceiling are shown on plan, multiply the length of the plancier by the cornice projection in feet, which gives the actual surface to be covered.

If 1 x 6 ceiling is used, add 1/5
If 1 x 4 ceiling is used, add 1/4

PORCH CEILING:—If ceiling is used for porches, add the above amounts to actual surfaces to be covered, but specify the lengths of ceiling required except when ceiling runs lengthwise.

VERGE BOARDS:—Where verge boards are not band sawed or carved, they should be listed under this heading. Unless specified on plans, they should be 1⅛″ material. When possible list in full length pieces. When verge boards are too long and must be spliced, add 1″0″ extra length to each board for diagonal splice. Refer to Page 56, Figure 54. Sometimes 1⅛″ material is also used for frieze, but usually it is more economical to use 1″ stock and fur it with pieces of wood lath or other ¼″ thick strips.

CORNER BOARDS:—List in full length pieces when possible.

PORCH LATTICE FACINGS, COLUMN CASINGS, PORCH RAILING CAPS, PORCH POSTS, PORCH NEWELS, PORCH RAILS, PORCH BALUSTERS, STEP STRINGERS, STEP TREADS, STEP RISERS, WALL COPING, HALF TIMBERS, PANEL STRIPS, WOOD LINTELS, FLOWER BOX MATERIAL and ACCESS DOOR MATERIAL should be listed in pieces of stock sizes. Material for RAFTER ENDS, unless scroll sawed, should be listed under this heading. This will usually be the same dimension as the main rafters.

### 27. SCAFFOLDING, SHORING AND ARCH CENTERS.

SCAFFOLDING:—As a general rule scaffolding can be omitted unless the work is not to be done by an established contractor, in which case the necessary materials for this purpose should be included.

SHORING:—Material of proper size and strength must be included for the purpose of supporting reinforced concrete during the setting period.

ARCH CENTERS:—Include material required to construct forms for masonry arches.

### 28. MISCELLANEOUS FRAMING.

List an arbitrary amount of 2 x 4's to take care of any and all of the minor requirements about the building such as corner blocking, accessory and fixture backing, wooden brick, etc. In small houses 100 lineal feet should be the minimum. Short lengths are suitable for this purpose.

### 29. DEADENING.

Obtain actual area to be covered, and then adjust for the particular material or deadening system specified. Where blanket material is interlaced in structural members, add 25%.

### 30. INSULATION.

To find the number of square feet of insulation required, deduct the openings from the area to be covered as insulation lays practically without waste.

### 31. WALLBOARD.

List number of stock size panels required to cover symetrically areas for which it is specified.

### 32. PLYWOOD.

Compute the square feet of all walls and ceilings to be covered, and list the same, minus large openings only. Do not deduct for single windows and doors. List in suitable stock size sheets.

## BUILDING PAPER

To the area of all surfaces to be covered, add 10%.

List the number of whole rolls of paper which are required for each purpose, giving weight and number of feet per roll.

### 33. FLOOR LINING.

Is usually red rosin sized, asphalt saturated, asphalt saturated and coated or dry felt.

**34. SHEATHING PAPER.**

Is usually asphalt saturated and coated, half-ply house lining or any one of several other papers which are fibred and waterproofed.

**35. MISCELLANEOUS BUILDING PAPER.**

For waterproofing and protection of floors and other special purposes.

## MILLWORK

*When not shown on plans it may be necessary that a special sketch be made or secured showing design and construction details of special millwork. Quality and kind of wood used for all millwork should be listed with each item to conform to specifications.*

**36. EXTERIOR LINEAL TRIM.**

List number of lineal feet, adding 10% for waste. Give size or stock numbers. In listing lineal feet of wooden gutters, mention that necessary metal fittings are to be included.

**37. EXTERIOR MILLWORK.**

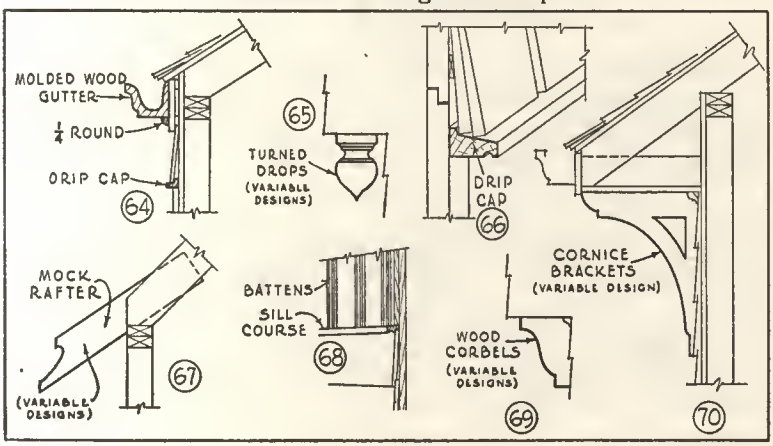
VERGE BOARDS:—List right, left or pairs; give thickness and width of each member and overall length.

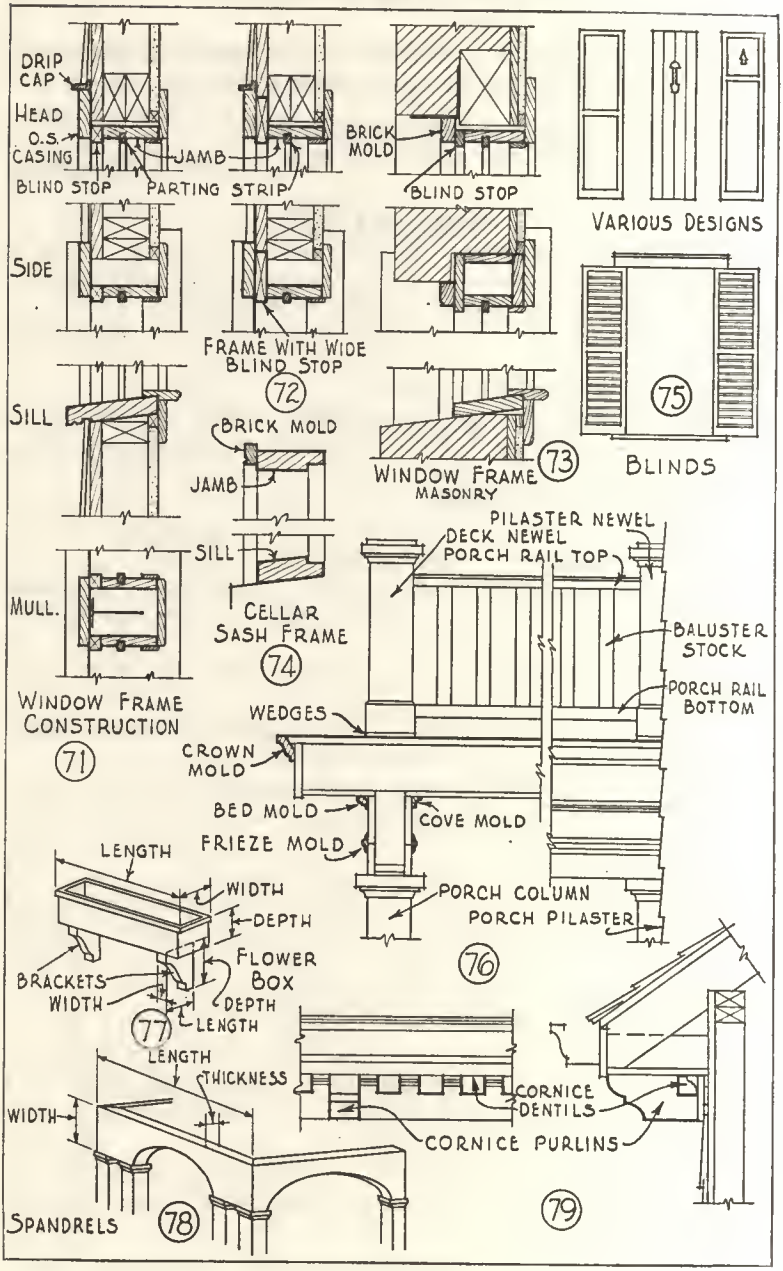
MOCK RAFTERS:—List number of common, valley and hip required; give thickness, width, length and horizontal projection.

WOOD CORBELS:—List number shown on plan; give thickness, width and length.

CORNICE BRACKETS:—List number shown on plan; give thickness, width, length and projection.

TURNED DROPS:—List number shown on plan; give each horizontal dimension and length of drop.




DRIP CAP
HEAD
O.S. CASING
BLIND STOP
JAMB
PARTING STRIP
BRICK MOLD
BLIND STOP
VARIOUS DESIGNS
SIDE
FRAME WITH WIDE BLIND STOP
72
SILL
BRICK MOLD
JAMB
WINDOW FRAME
MASONRY
73
75
BLINDS
SILL
CELLAR SASH FRAME
74
MULL.
WINDOW FRAME CONSTRUCTION
71
PILASTER NEWEL
DECK NEWEL
PORCH RAIL TOP
BALUSTER STOCK
PORCH RAIL BOTTOM
WEDGES
CROWN MOLD
BED MOLD
COVE MOLD
FRIEZE MOLD
PORCH COLUMN
PORCH PILASTER
76
LENGTH
WIDTH
DEPTH
FLOWER BOX
BRACKETS
WIDTH
DEPTH
LENGTH
77
LENGTH
THICKNESS
WIDTH
SPANDRELS
78
CORNICE DENTILS
CORNICE PURLINS
79

HALF TIMBER WORK:—List pieces; give thickness, width and length.

WOOD LINTELS:—List number shown on plan; give thickness, width and length.

SPANDRELS:—List each size separately, giving overall width, length and thickness.

SPECIAL SIDING:—List pieces or lineal feet; give thickness and width.

TRELLIS:—List number required, give width and height according to plan. If trellis can be built of straight material give size of members required, also length and number of pieces, or lineal feet.

FLOWER BOX BRACKETS:—List number shown on plan; give thickness, width and length.

FLOWER BOXES:—List number shown on plan; give width, depth and length.

PORCH COLUMNS:—List number shown on plan; give diameter or horizontal dimensions and height.

PILASTERS:—List number shown on plan; give thickness, width and height.

PORCH NEWELS:—List number shown on plan; give diameter or horizontal dimensions and height.

DECK NEWELS:—List number shown on plan; give diameter or horizontal dimensions and height.

HOOD BRACKETS:—List number shown on plan; give thickness, width and length.

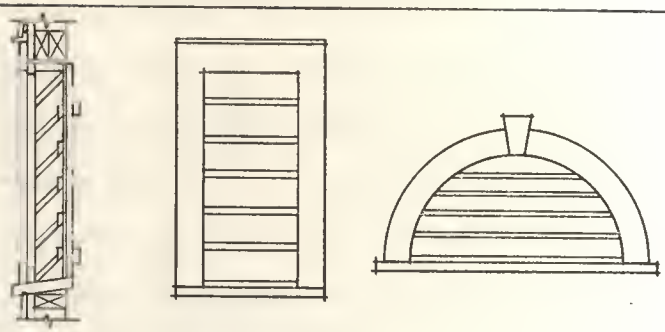
BLINDS:—List pairs; give width, height, thickness and if standard design give stock number; note if blinds are to be rabbeted. List single blinds in same manner.

## 38. WINDOW AND SASH FRAMES.

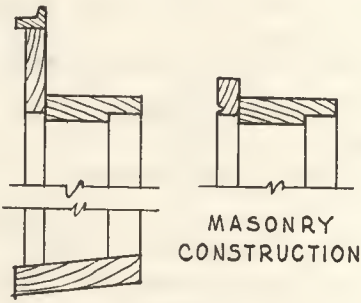
CELLAR SASH FRAMES:—List number shown on plan; give opening size or glass size, number of lights, thickness of sash and width of jamb. Note whether for masonry wall or frame wall.

WINDOW FRAMES:—List number shown on plan; give opening size or glass size, number of lights and thickness of sash. Note wall construction in which frames are to be used and style and manufacture of frame.

CASEMENT SASH FRAMES:—List number shown on plan; give opening size or glass size, number of lights and thickness of sash. Note wall construction in which frames are to be used and style and manufacture of frame.

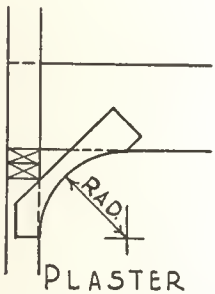


(80) LOUVRES

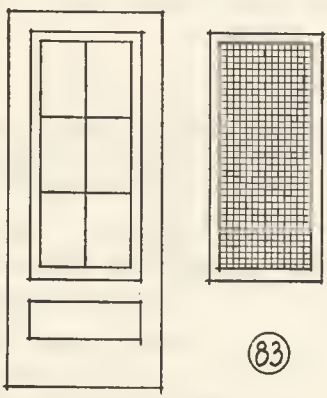



FRAME CONSTRUCTION

(81) DOOR FRAMES

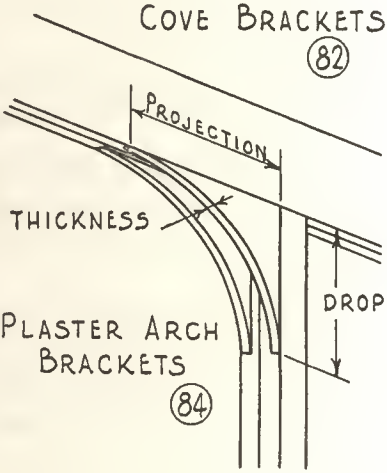



PLASTER
COVE BRACKETS
(82)



(83)

COMBINATION DOOR




PLASTER ARCH
BRACKETS
(84)

STATIONARY SASH FRAMES:—List number shown on plan; give opening size or glass size, number of lights and thickness of sash. Note wall construction in which frames are to be used. Examine plans to see if plate glass is used instead of sash.

**39. LOUVRES.**

List number and style shown on plan and give size of louvre opening. Note wall construction in which louvres are to be used.

**40. EXTERIOR DOOR FRAMES.**

List number shown on plan; give door size and thickness and style of frame. Note wall construction in which frames are to be used.

If front entrance is shown on plans list either in combination with or without door frame as shown on plans. If combined with door frame give size and thickness of door. Mill will refer to plans for style, further information and details.

**41. PLASTER COVE BRACKETS.**

List number of common, inside corner and outside corner brackets; give thickness, radius or projection, drop and sketch. Number of common brackets will be ¾ of the perimeter of the room. Refer to Page 62, Figure 82.

**42. PLASTER ARCH BRACKETS.**

List four brackets for each arch; give thickness, projection, drop and paper pattern of finished line of ½ or full arch. Refer to Page 62, Figure 84.

**43. WINDOWS AND SASH.**

List cellar sash, windows, casement sash, stationary sash and interior sash shown on plan; give glass or opening size, number and arrangement of lights, thickness of sash and kind of glass. Note whether division bars are wood or metal. State whether sash are to be glazed or open. Plate glass set in stationary sash frames shall be listed separately.

**44. SCREENS.**

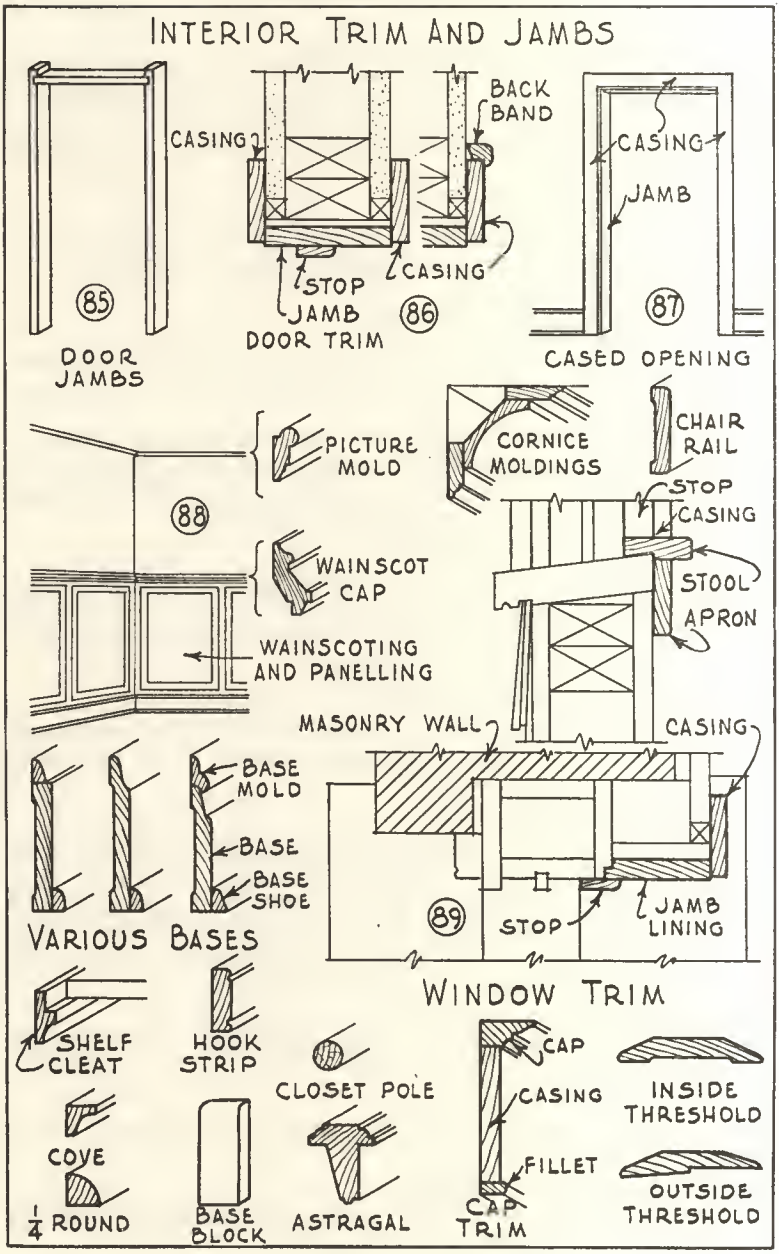
Give opening size of sash or window. Note mesh and kind of wire.

**45. STORM SASH.**

Give opening size of sash or window. Note which storm sash are to have ventilators.

**46. COMBINATION DOORS.**

Give size and stock number; note kind of glass, mesh and kind of wire. If special design give sketch.


INTERIOR TRIM AND JAMBS
CASING
BACK BAND
CASING
STOP
JAMB
CASING
DOOR TRIM
85
86
87
DOOR JAMBS
CASING
JAMB
CASED OPENING
PICTURE MOLD
CORNICE MOLDINGS
CHAIR RAIL
88
STOP
CASING
WAINSCOT CAP
STOOL
APRON
WAINSCOTING AND PANELLING
MASONRY WALL
CASING
BASE MOLD
BASE
BASE SHOE
89
STOP
JAMB LINING
VARIOUS BASES
WINDOW TRIM
SHELF CLEAT
HOOK STRIP
CLOSET POLE
CAP
CASING
INSIDE THRESHOLD
COVE
FILLET
1/4 ROUND
BASE BLOCK
ASTRAGAL
CAP TRIM
OUTSIDE THRESHOLD

**47. DOORS.**

Give width, height, thickness, panel arrangement and stock number. List half and half doors separately. Note whether for inside or outside use. Give number and arrangement of lights for sash doors, and indicate whether wood or metal bars are to be used. List one folding door astragal or one pair sliding door astragals where required. List mirror doors separately indicating whether plain or bevel plate mirror is to be used.

**48. JAMBS.**

List interior door, clothes chute, scuttle, access panel and partition sash jambs shown on plan; give size of jambs for door and all other openings. List door stops with jambs except for double acting doors. List half and half jambs separately indicating what kind of wood stops are to be.

**49. WINDOW AND SASH TRIM.**

List one side of window trim for each single or multiple frame by glass or opening size; give construction of wall, design of trim, width of stop, width and rabbet of stool and width of mullion casing. Where required list sub-jambs or sets of jamb linings. List stops and stools for windows in unfinished parts of the building.

**50. DOOR TRIM.**

List one side of door trim for each outside door, each clothes chute door, access panel and early delivery frame and two sides for each inside door. Give door size and design of trim. Sides of closet door trim to be listed separately.

**51. INTERIOR LINEAL TRIM.**

List number of lineal feet required for base, chair rail, plaster wainscot cap, wall moldings, picture molding, cornice and hook strips; if selected from stock, give number. Add 10% for waste.

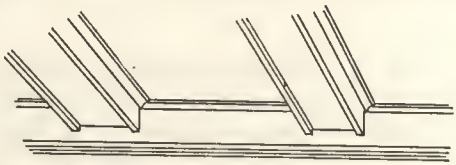
**52. WAINSCOTING AND PANELING.**

List as specified or detailed.

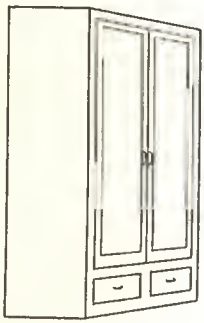
The amount of random width board wainscoting required will be the actual area to be covered, plus 25%.

Skeleton wainscoting may be listed in pieces giving thickness, width and length of each member or, in lineal feet, giving thickness and width.

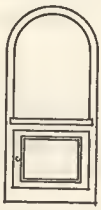
List paneled wainscoting by sections; give width, height, thickness, panel arrangement and sketch of each section if not detailed.



(90) CEILING BEAMS

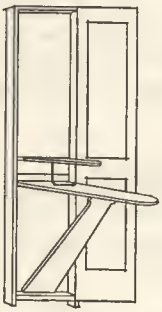


WARDROBE
(93)



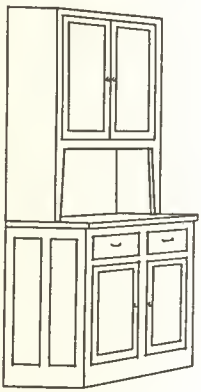
(91) TELEPHONE CABINET

(92) NICHE SHELF



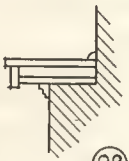
(94) IRONING BOARD

CHINA CABINET
(95)

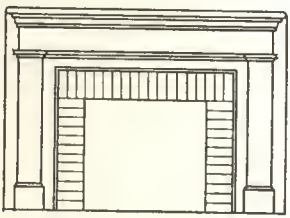


KITCHEN CABINET
(96)


(97)



(98) MANTEL SHELF



(99) MANTEL

**53. CLOSET SHELVES.**

List number shown or specified; give thickness, width and length.

**54. GARMENT HANGER RODS.**

List number shown or specified; give diameter and length. List two ferrules (one open) for each rod, if of wood.

**55. CEILING BEAMS.**

List number of each size shown or specified; give depth width and total length.

**56. CABINETS.**

KITCHEN CABINETS:—Give width, height and depth: number, style and arrangement of doors; number of drawers; height from floor to top of worktable; if built in connection with or around sink, specify size and location of sink and height from finished floor to top of drain board; specify if one or both ends are to be finished. Give any other special information.

IRONING BOARD:—Give design, height of door and any other special information.

CHINA CABINETS:—Give width, height and depth, stock number or sketch of face of cabinet. If sash doors, specify whether wood or metal bars are to be used. Give any other special information.

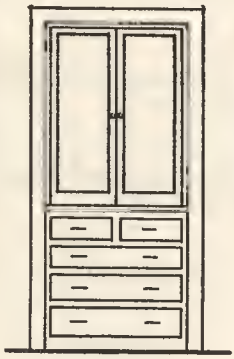
TELEPHONE CABINET:—Give width, height and depth, and stock number or sketch.

MANTEL SHELF:—Give width and projection of brick below shelf; width and projection of chimney breast above shelf; width and thickness of shelf and design. If bookcases line with mantel, give height from finished floor to top of brick and sketch, if not detailed.

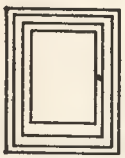
MANTEL:—Give width and height of wood opening; height to top of shelf and width, thickness and length of shelf overall. Give stock number or sketch, if not detailed.

BOOK CASES:—Give width, height and depth; number, style and arrangement of doors; description of art-glass; any other information. Indicate finished ends or give depth and width of recess.

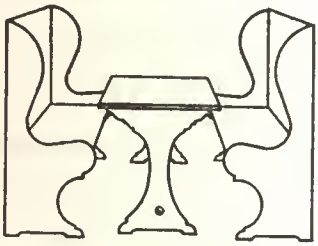
WARDROBES:—Give width, height and depth; number, style and arrangement of doors and drawers; indicate finished ends; any other information. If recessed give depth and width.



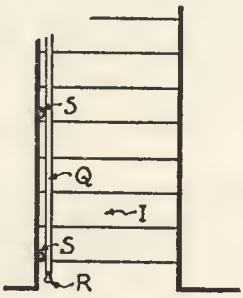
(100) LINEN CABINET



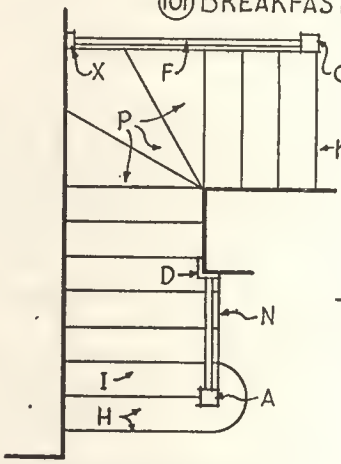
MEDICINE CABINET (102)



(101) BREAKFAST SET

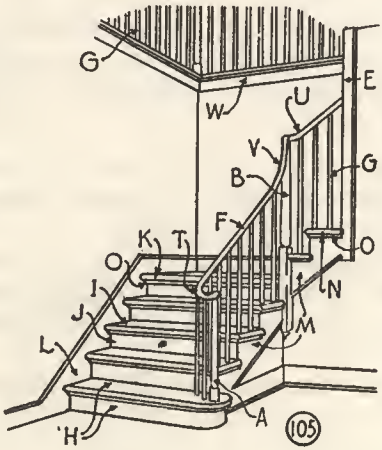



(103) BOX STAIR




(104) PART OPEN AND PART BOX

TOWEL CABINET (135)




(105)

## * KEY *

TO ILLUSTRATIONS 103, 104 & 105

A. STARTING NEWEL.
B. ANGLE NEWEL.
C. LANDING NEWEL.
D. PILASTER NEWEL.
E. PARTITION CASING & JAMB.
F. HAND RAIL.
G. BALUSTERS.
H. STARTING TREAD & RISER.
I. TREADS.
J. RISERS.
K. LANDING TREAD.
L. WALL STRING.
M. FACE STRINGS.
N. NOSING.
O. COVE MOLD.
P. WINDERS.
Q. WALL RAIL.
R. WALL RAIL ENDS.
S. WALL RAIL BRACKETS
T. VOLUTE.
U. EASING.
V. GOOSENECK
W. WELL-CURBING & CASING.
X. WALL ROSETTE.

LINEN CABINET:—Give width, height and depth; number and style of doors and drawers.

MEDICINE CABINET:—Give width, height and depth of rough opening, size of mirror and stock number.

TOWEL CABINET:—Give width, height and depth; number and style of doors.

BREAKFAST SETS:—Give size of space in which breakfast set is to be placed, size of table, length of bench and number of pieces to the set.

## 57. STAIRS.

Stair building is a specialized trade combining the highest skill of the carpenter and cabinet maker. Because of the various floor plan layouts, heights of ceilings, turns and angles each stairway presents individual construction conditions which require the services of the experienced stair-builder. In other words, each home design presents a different stair problem. The estimator, therefore, should become familiar with the numerous stair parts, names and how to identify and list same when estimates and costs are required. Working plans and details are usually sufficient for estimating purposes.

***The following is a guide for listing stair material and parts as shown on working drawings, for estimating purposes.***

STARTING NEWELS:—List number required. Give catalog number.

ANGLE NEWELS:—List number required. Give catalog number.

LANDING NEWELS:—List number required. Give catalog number.

PILASTER NEWELS:—List number required. Give catalog number.

PARTITION CASING AND JAMB:—Give length and size of jambs and casings.

HAND RAIL:—List in pieces of workable length. Give style and catalog number.

BALUSTERS:—List number required, size, length and catalog number. List plain square balusters, when required in lineal feet giving size.

STARTING TREADS AND RISERS:—List number required and state whether half circle or quarter circle, state whether right end or left end return and give width stair.

TREADS:—List number required, thickness, size and length.

RISERS:—List number required, thickness, size and length.

LANDING TREADS:—List number required, size and length.

WALL STRINGS:—List in lineal feet. (Usually 2 members). Give size and if to be housed, specify.

FACE STRINGS:—List in lineal feet. (Usually 2 members) and mention whether open or closed string. Give size and if to be sawed and mitered, specify.

NOSING:—List in lineal feet and give size.

COVE MOLD:—List in lineal feet and give size.

WINDERS:—List each set required, giving width of stair, number of steps and whether right or left turn.

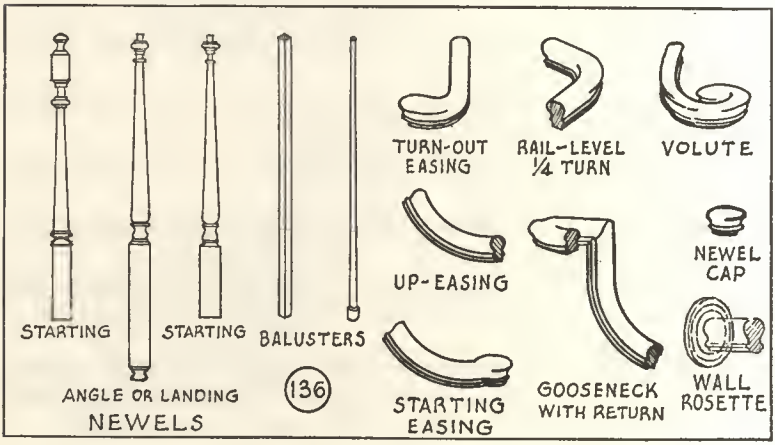
WALL RAIL:—List in pieces of workable length. Give size or diameter.

WALL RAIL ENDS:—List in pieces and give size.

WALL RAIL BRACKETS (METAL):—List number required. Figure approximately 3 to a straight 14 ft. length of rail or 4 ft. apart. Give diameter of rail.

VOLUTES:—List number required. Specify style or catalog number (to match hand rail), and whether right or left.

EASINGS:—List number of each kind required. Specify style or catalog number (to match hand rail). Specify whether turnout, starting, overhead, up, 90°, level quarter turn, etc.



GOOSENECKS:—List number of each kind required. Specify style or catalog number (to match hand rail). Specify right or left.

WELL-CURBING AND CASING:—List in pieces of workable lengths.

WALL ROSETTE:—List number required. Diameter should be sufficient to accommodate hand rail used.

Examine plans for special stair parts not commonly used and make sketch of same for estimating purposes.

***The following is the correct procedure to obtain information and measurements at the building necessary to prepare and actually construct the stair.***

BOX:—(Stairs setting entirely between walls). Furnish sketch showing plan of stair well, width between plaster, horizontal length from rough header at top of flight to face of first riser, thickness of partition between flights, total rise of each flight, direction of ascent and number and position of winders. If upper floor covers part of stair, give ceiling height and horizontal distance from rough header at top of flight to face of plaster on header above stair.

Locate doors opening onto or under stairs, giving size and swingway. Indicate newels, wall rails (indicate whether turned ends or returns to wall are required) and balustrades, giving overall length and size and design of all members. When well hole trim is required, give total thickness of floor construction, i. e., dimension from face of ceiling plaster to top of finished floor.

Specify kind of wood for stringers, risers and treads, giving thickness of each.

PART OPEN AND PART BOX:—In addition to the information required for box stairs, furnish sketch showing shape and dimensions of dwarf walls. Give measurement from face of plaster on main wall to face of plaster on dwarf wall.

Specify whether plain open, bracket open, plain curb or panel curb face string is wanted.

DISAPPEARING STAIR:—Give floor to floor height, size of finished ceiling opening, list to include jamb and trim and list manufacture and catalog number.

## 58. MISCELLANEOUS MILLWORK.

Examine plans for sundry items of millwork not covered in this check list such as utility cases, wood corner guards, etc.

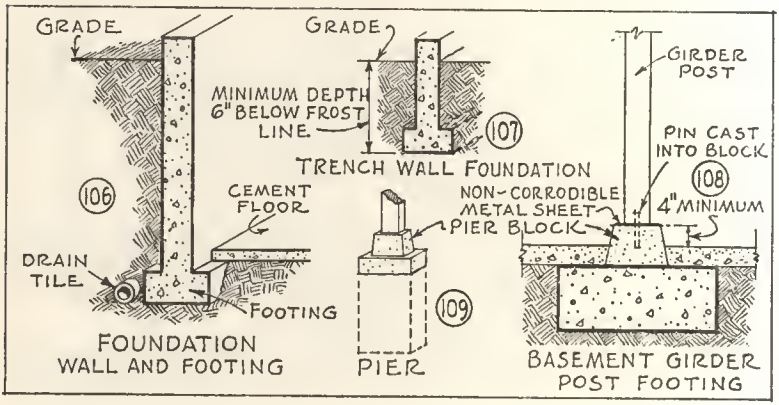
# MASONRY

## 59. EXCAVATING.

Excavations for the main foundations should extend 1 foot beyond the foundation walls to allow for footings and form work, also for laying stone or brick. To compute the yards of excavations requires simple mensuration. Area to be excavated in feet x depth of excavation in feet divided by 27 = cubic yards. Trench Work: Lineal feet x width of trench in feet (not less than 1 foot) x depth in feet divided by 27 = cubic yards. Piers: area in feet x depth in feet divided by 27 = cubic yards. Excavations of sloping ground can be computed by using an average depth. Excavations of sloping ground for buildings with wings, ells and irregular shapes should be divided into prisms and the cubic feet or yards computed separately and added together for the total.

## 60. CONCRETE FOUNDATIONS.

To compute the actual quantities of cement, sand, stone or gravel required to construct footings and walls, proceed as follows:—Lineal feet of footing x its cross section area in feet = cubic feet. Lineal feet of wall x its thickness in feet x its height in feet = cubic feet. Multiply the number of piers by the cubic contents in feet for each pier. Add together all cubic feet of concrete and divide by 27 which will equal total cubic yards. Refer to Page 105, Table No. 1; multiply by the factors shown for a mixture required, for one yard of concrete.



## EXAMPLE.

Assume the plans show an 8″ x 18″ footing supporting an 8″ wall, 7 feet in height, the foundation being 108 lineal feet:—the footings 8″ x 18″ under the main wall equal 108 lin. ft. i.e. 108 x $\frac{8''x18''}{144}$ equals 108 Cu. Ft.

The walls above footings are 8″ thick which equals ⅔ ft. x
the height 7 feet x 108 lineal feet equals.....504 Cu. Ft.
5 post piers, 2 ft. x 2 ft. x 1 ft. equals..... 20 Cu. Ft.
6 area walls, 8 Cu. Ft. in each equals..... 48 Cu. Ft.
24 lin. ft. Porch Trench Walls, 8″ thick, 4′ 0″ deep,
24 x ⅔ x 4 equals ..... 64 Cu. Ft.

Total 744 Cu. Ft.

744 divided by 27 equals 27.55 cu. yds. or 28 yards.
Using 1-3-5 mixture as specified, we find by referring to Page 105, Table No. 1, that the required proportion of cement in bbls. is 1.13 per yd., the sand in yards .48 and stone in yards .80.
Hence 28 Yds. x 1.13 equals 32 bbls. cement
28 Yds. x .48 equals 13½ Yds. sand
28 Yds. x .80 equals 22½ Yds. stone or gravel
NOTE:—All openings in foundation walls should be deducted.

## 61. ROUGH STONEWORK.

FOUNDATIONS, WALLS, PIERS, ETC.:—Stone used for this purpose is usually native quarry, rubble or dimension stone. In most sections of the country measurement by the cord is preferred. It is also estimated by the perch and by the cubic yard. Rubble stone consists of pieces of irregular size and is most easily obtained from the quarry up to 12″ in thickness by 24″ in length. Stone ordered of a certain size or to square over a certain width, height and thickness is called dimension stone. For dwelling foundations, however, rubble stone is sufficient.

To compute the number of cubic yards, cords or perches of stone required for a wall, obtain cubic feet of walls, footings, areaways and piers required (in the same manner as concrete is computed as described in Section 60), deduct large openings; divide cubic feet by *128 to obtain number of cords; divide by 24-3/4 to obtain number of perches; divide by 27 to obtain number of cubic yards. Coarse sand only should be used in the mortar mixture. Below grade a 1 to 3 cement mortar should be used. To obtain necessary quantities of sand, cement and lime required, multiply the amount of yards, cords or perches by respective factors given in Table No. 12, Page 112.

* In some sections stone is figured by a cord containing 100 cu. ft.

RANDOM STONE VENEER:—When random stone veneers are used for the exterior of a building (either frame or backed up with brick), they are usually 4″ thick and very seldom run over 6″ in thickness. These walls are figured by the square foot with deductions made for openings and with 20% added to the remainder for waste. For mortar refer to Page 112, Table No. 12.

## 62. CONCRETE BLOCKS.

STANDARD CONCRETE BLOCKS OR CINDER CONCRETE BLOCKS:—Check plan to be sure that concrete blocks work to exact block heights, without cutting or splitting if possible. This may cause a change in the basement ceiling height. Footings under concrete block walls are usually of concrete, hence, compute quantity of concrete in same manner as described in Section 60.

COMPUTE QUANTITY OF BLOCKS AS FOLLOWS: LINEAL FEET OF WALL x ¾ x NUMBER OF COURSES IN HEIGHT=ACTUAL QUANTITY OF 8″x8″x16″ BLOCKS.

Deduct 1/2 blocks, 1/4 blocks and corner blocks from above quantity and list separately. Also make necessary deductions for openings. Blocks of different facings should be figured in the same manner by using the number of courses required for each facing. Refer to Table No. 3, Page 106.

Quantities of lime, sand and cement required for laying up 100 blocks may be obtained from Page 112, Table 11.

### EXAMPLE

Required: quantities of Cement, Sand and Lime to lay a cement block wall composed of 750 standard 8″ x8″ x 16″ blocks with ¼″ mortar joints.

750 ÷ 100 = 7.5

Bbls. of Cement required = 7.5 x .37 = 2.78 or 3 Bbls. Cement

Yards of Sand required = 7.5 x .103 = .7725 or 1 Cu. Yd. Sand

Lbs. of Lime required = 7.5 x 8.88 = 66.6 Lbs. Lime

NOTE:—If top row of blocks is to be filled solid with cement, for every 100 blocks in top row add 2 Bbls. cement, ½ Cu. Yd. of sand and 40 Lbs. lime to quantities required.

PIER BLOCKS:—Examine plan for pier blocks and list separately. See illustrations, Page 72.

## 63. WATERPROOFING.

The exterior surface of basement walls below grade line should be painted with a heavy coat of liquid asphalt or tar. It requires about one gallon of such paint to cover 100 square feet.

INTEGRAL WATERPROOFING:—Refer to Page 105, Table No. 2 for quantities of integral waterproofing required for various concrete mixtures.

## 64. DRAIN TILE.

List number of feet required as shown on plan or specified.

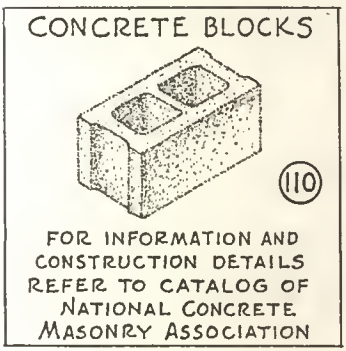
## 65. CONCRETE FLOORS, STEPS, ETC.

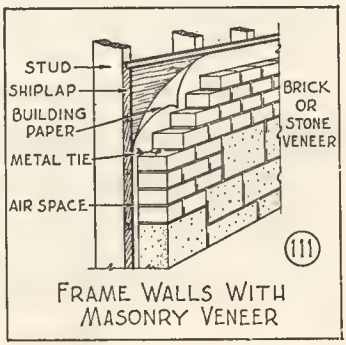
Compute the area in square feet and obtain the quantity of ingredients according to the mixture in Table 4, Page 107. Multiply the area in hundreds of sq. ft. by the respective factors given in the table to compute materials required.

CONCRETE STEPS, COPINGS, RETAINING WALLS, ETC.:—Compute the total number of cubic feet required for same and apply factors given in Table No. 1, Page 105 for concrete mixture specified.

CONCRETE COLOR:—List quantity according to directions of manufacturer.

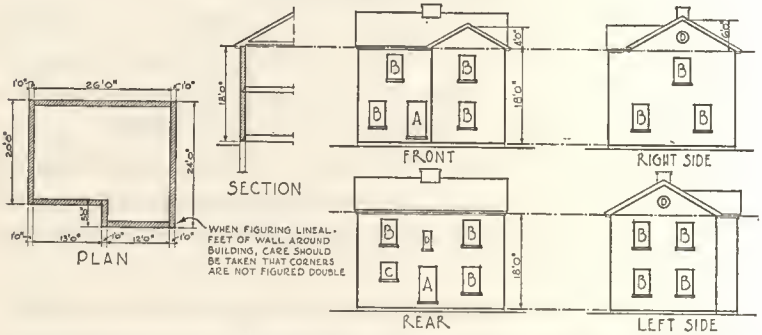
FLOOR HARDENER:—List quantity according to directions of manufacturer.



## 66. BRICKWORK.

In computing brickwork the method giving most accurate results is the square foot method as follows:—Compute the actual square feet of wall and multiply by the number of brick per square foot (as shown in tables) for a wall of the thickness selected or shown on plan. If there are several belts of cut stone, terra cotta, etc. they should be deducted from the wall area. Usually half of the window and door openings are deducted from common brick walls, but no allowance is made for small openings. For face brick and brick veneer walls deduct full areas of openings. Deduct from wall area all overlapping corners. Refer to Page 108, Table 5 and Page 110, Table No. 9. Also see examples below.




### SQUARE FOOT METHOD OF COMPUTING NUMBER OF BRICK IN A WALL

EXAMPLE A:—(For Dimensions See Drawings Above).
Lineal Feet Around Building Less Overlapping Corners =
20 + 26 + 24 + 12 + 5 + 13 = 100 Ft.
Height of Wall Around Building (From Wall Section) = 18 Ft.
Therefore, Area of Wall 18′0″ High = 100 x 18 = 1800 Sq. Ft.

Front Gable Area = $\frac{14 \times 4}{2}$ = 28 Sq. Ft.

Right and Left Side Gable Areas = 20 x 6 = 120 Sq. Ft.

Total Gross Area = 1948 Sq. Ft.

DEDUCTIONS FOR OPENINGS:—
2 Door Openings (A) 21 Sq. Ft. = 42 Sq. Ft.
14 Window Openings (B) 14 Sq. Ft. = 196 Sq. Ft.
1 Window Opening (C) = 10 Sq. Ft.
No Deductions for Small Openings. (D)

Total Area of Openings 248 Sq. Ft.
50% Considered for Deduction 124 Sq. Ft.

Net Area 1824 Sq. Ft.

EXAMPLE A:—(Continued).

From Table 9, Page 110, 21 Brick are Required per Sq. Foot of 12" Brick Wall.
Then 21 x 1824 = 38304 Common Brick Required to Lay Up Wall.

MORTAR REQUIRED:—

From Table 10, Page 111, assuming a ½" joint and a mortar mixture of 1 Vol. Cement, 1 Vol. Lime and 6 Vols. sand.
38.304 x .75 = 28.73 or 28¾ Bbls. Cement
38.304 x .67 = 25.66 or 25¾ Cu. Yds. Sand
38.304 x 120 = 4,596 Lbs. Lime

EXAMPLE B:—

Computation Using 4" Face Brick Veneer Wall, ⅜" Joint, Brick Standard Size. Lineal Feet Around Building Less Overlapping (4") Corners =
20' + 27' 4" + 24' + 13' 4" + 4' 4" + 13' 8" = 102' 8"

| | | |
|---|---|---|
| Area of Wall 18'0" High = 18 x 102⅔' = | 1848 | Sq. Ft. |
| Area of Gables (Same as in Example A) = | 148 | Sq. Ft. |
| Total Gross Area = | 1996 | Sq. Ft. |
| Deduct Total Area of Openings | 248 | Sq. Ft. |
| Net Area = | 1748 | Sq. Ft. |

From Table 5, Page 108, 6½ Brick Are Required Per Sq. Foot of Wall.
Then 6½ x 1748 = 11362 Face Brick Required to Lay Up Wall.
Mortar Required for Above:—
Using Mixture 1 Vol. Cement to 2 Vols. Lime to 9 Vols. Sand.
From Table 10, Page 111.
11.362 x .38 = 4.32 or 4½ Bbls. Cement
11.362 x .50 = 5.68 or 5¾ Cu. Yds. Sand
11.362 x120 = 1,364 Lbs. Lime
Assuming a Black Mortar Color is Wanted, From Table 8, Page 109, 75 Lbs. is Required for Each 1000 Brick. Therefore, 11.362 x 75 = 852 Lbs. of Mortar Color Required.

PIERS:—To obtain number of brick required for piers of various sizes and mortar joints refer to Page 108, Table No. 6.

EXAMPLE:—Plans show two piers 12" x 16", each 10' 0" in height, Standard Brick. The mortar joint is 3/8" thick. 2 x 10 x 27½ = 550 Brick required. If sizes of brick and mortar joint are not given, see Page 110, Table No. 9.

MORTAR:—Refer to Page 111, Table No. 10. If the number of brick to be used has been determined, quantities of lime, sand and cement can be computed from this table.

MORTAR COLOR:—The quantity of mortar color required per 1000 brick varies with the thickness of joint used and the shade selected. Refer to Page 109, Table No. 8. Also see foregoing Example B.

TIES AND METAL BONDS:—Multiply the surface in square feet by .80; the result will be quantity of ties required. In Example B the net area of brick wall in square feet is 1748. Therefore 1748 x .80 = 1398 or for practical listing 1400 ties are required in this case. For joist pin anchors and wall plate anchor bolts see Hardware.

TILE COPING:—Manufactured in 2 Ft. lengths. Measure in even lineal feet, then divide by 2 which equals pieces to cover wall. List in pieces and designate thickness of wall it covers; as 30 pcs. vitrified tile coping for 13″ brick wall.

## 67. CHIMNEYS AND FIREPLACE.

For ordinary chimneys of various sizes refer to Page 109, Table No. 7, or Page 110, Table No. 9.

### EXAMPLE.

Find the quantity of brick required for standard brick two-flue chimney, laid with ⅜″ mortar joint and including one 8 x 8 flue and one 8 x 12 flue. Height of the chimney is 28′ 0″. From Table No. 7 the figure opposite the 8 x 8 and 8 x 12 Double flue and in the ⅜″ mortar joint column is 51. Multiply the height of the chimney (28′ 0″) by 51 and the result, 1428, is the quantity of brick required.

Where size of brick and thickness of mortar are not specified, use table No. 9, Page 110.

FLUE LINING:—List in even lineal feet. In ordinary chimneys figure lineal feet from chimney footing to top of chimney. Fireplace flues are figured from 1′0″ above damper to top of chimney.

ANGLE IRON:—Unless otherwise shown on plan, provide a light 4″x4″ steel angle to support brick, blocks or stone pieces over fireplace opening. Length of angle equal to width of opening plus at least 4″ for bearing at each end.

FLUE POTS:—List flue pots as indicated on plans giving size, style and color.

DOME DAMPER: — Dome dampers vary in outside dimensions and design with different manufacturers. The control is usually designated as "front" or "side" for the worm and gear dampers, i. e., the damper control is either placed at one end of the brick mantel breast or on the face of it directly above and at one side of the opening. Another type of damper that has no control visible on the brick mantel breast is called "poker control". This has a damper controlling lever with a loop in the end of it which may be reached with the poker.

**ASH DUMP:**—List one ash dump for each fireplace. Ash dumps are automatic and usually have two-leaf drops.

**CLEAN-OUT DOOR:**—List one clean-out door for each chimney flue. In flues 8″ wide an 8 x 8 door is used; in 12″ flues an 8 x 10 door is used. List one 12 x 15 ash-pit door for each basement ash-pit.

**HEARTH:—BRICK, TILE, OR STONE.** Brick vary in size. After their selection calculate the area of the face, adding ½″ to the width and length for joints; using the area thus found as a devisor, ascertain number of brick per square foot.

If rectangular tile are to be used, compute the area of a single tile including a joint on each side and use this as a devisor to ascertain the total number of tile. If ceramic or other types of tile are used, list number of square feet to be covered.

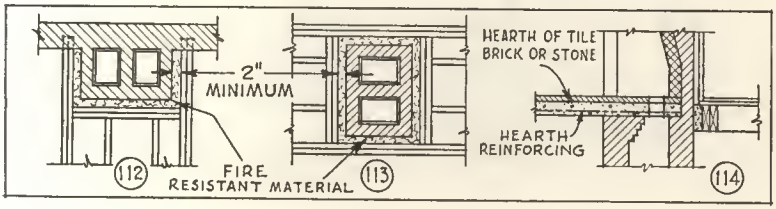
If flagstones are used, compute the square feet required and specify thickness of stone. Add 20% to square surface for waste.

If cut stone hearth is used, compute exact area to be covered and thickness of stone. Make drawing giving exact dimensions of area with joints and shape of each stone.

**FIRECLAY:**—About 300 lbs. (3 sacks) are required per 1000 firebrick.

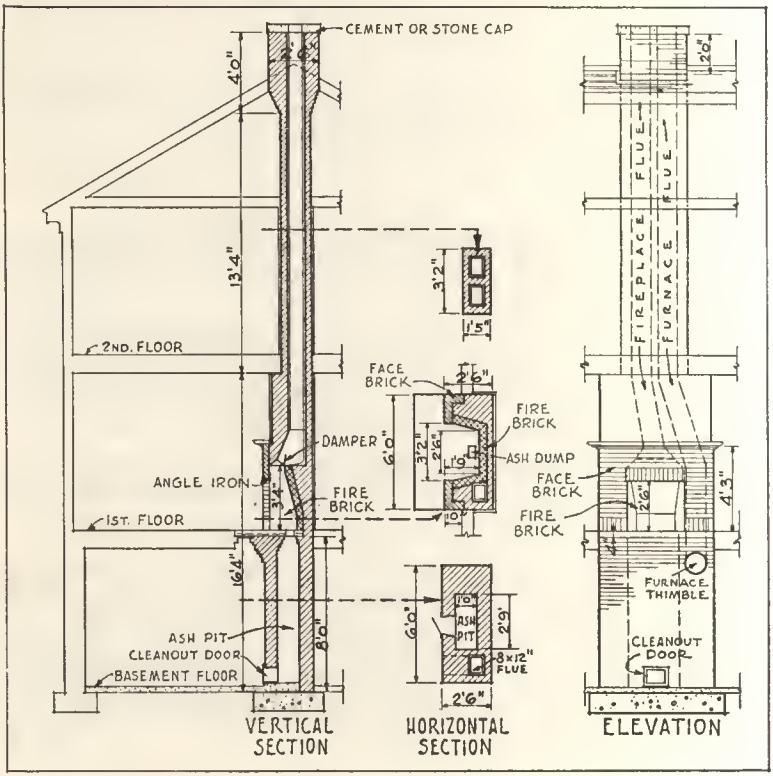
**FIRE RESISTANT MATERIAL:**—Provide sufficient fireproof material to be packed 2″ thick between chimney and woodwork when flues are not more than 4″ from the outer line of brick. For this purpose an insulating cement is manufactured which is obtainable in 50 Lb. sacks. Each sack covers 25 Sq. Ft. of area 1″ thick or 12 Sq. Ft. of area 2″ thick. Hence the sq. foot area of surface to be covered ÷ 12 = quantity of 50 Lb. sacks required for 2″ of fire proofing.

**HEARTH REINFORCING:**—When wire mesh is used, give length and width required and square feet. If reinforcing rods are used, give number of pieces, size, kind and length.



## CUBIC METHOD FOR COMPUTING MATERIAL NECESSARY TO CONSTRUCT CHIMNEY AND FIREPLACE

A reliable procedure used in computing quantities of material necessary to construct a fireplace is the cubic method. The total volume of the chimney is first computed in cubic feet; then deductions are made for all openings such as ash pit, fireplace, flues, etc. Then convert net cubic feet of chimney into total quantity of brick. Next compute quantity of mantel brick for fireplace, quantity of fire brick and quantity of exposed brick for chimney; total these quantities and deduct sum from total quantity of common brick required. List all brick quantites separately. Compute mortar required from Table 10, Page 111. List all dampers, cleanout doors, ash dumps, steel angles, lineal feet of flues, fireclay, etc. as shown in fireplace details.



## EXAMPLE:—(See Drawing, Opposite Page)

(1) Total Volume:—6′ x 2½′ x 16-1/3′ = 245 Cu. Ft.
3-1/6′ x 1-5/12′ x 13-1/3′ = 60 Cu. Ft.
3-1/6′ x 2½′ x 4′ = 32 Cu. Ft.

Total Volume 337 Cu. Ft.

Deductions:—
Ash Pit = 1′ x 2¾′ x 8′ = 22 Cu. Ft.
Fireplace = 3-1/6′ x 1¾′ x 2½′ = 14 Cu. Ft.

(2) Flues:—Measure Actual Lineal Feet and Allow 1 Cu. Ft. Deduction Per Lineal Foot = 56 Cu. Ft.

92 Cu. Ft. Total Deductions

337 Cu. Ft. — 92 Cu. Ft. = 245 Cu. Ft.

(3) From Footnote on Page 110, 20 (Brick Per Cu. Ft.) x 245 = 4900 Brick
Therefore, a Total of 4900 Brick Are Required For Entire Fireplace.

Quantity of Face Brick for Fireplace: (6′ + 2/3′ + 2/3′) x 4¼′ = 31 Sq. Ft.
Minus Op'g. 2½′ x 3-1/6′ = 8 Sq. Ft.

23 Sq. Ft.

(4) From Table 9, Page 110, 7 (Brick Per Sq. Ft.) x 23 = 161 Face Brick Required for Fireplace.

(5) Quantity of Firebrick: (2½′ + 1¾′ + 1¾′) x 3-1/3′ = 20 Sq. Ft.
7 x 20 = 140 Firebrick Required.

Quantity of Facebrick For Chimney Above Roof.

(6) (2½′ + 2½′ + 2½′ + 2½′) x 2′0″ = 20 Sq. Ft.
7 x 20 = 140 Facebrick for Chimney

(7) 161 + 140 + 140 = 441 4900 — 441 = 4459 Common Brick

(8) Compute Quantities of Lime, Sand, Etc. Necessary for Mortar
4459 + 140 + 161 = 4759 Brick.
Then From Table 10, Page 111, Assuming a ½″ Joint and a Mortar Mixture of 1 vol. of Lime to 3 vols. Sand.

(9) 4.759 x 240 = 1,142 Lbs. Lime.

(10) 4.759 x .67 = 3.19 Cu. Yd. Sand.

(11) Fireclay: .140 x 300 = 42 Lbs. or ½ Sack (50 Lbs.) of Fireclay is ample.

(12) Material For Hearth:—Reinforced Concrete Slab is 16 Sq. Ft. by 4″ Thick. $\frac{16 \times \frac{1}{3}}{27} = .2$ Cu. Yds. Concrete.

Therefore, from Table 1, Page 105 (Using the Mixture in the Proportion of 1-2-4).

(13) .2 x 1.46 = .292 or ½ Bbl. Cement.

(14) .2 x .44 = .09 or ¼ Cu. Yd. Sand.

(15) .2 x .89 = .178 or ¼ Cu. Yd. Crushed Stone or Gravel.

**Then, From the Foregoing Computations, List All Items as Follows:—**

4459 Common Brick (Item 7)
140 Face Brick (Item 6)
170 Face Brick for Mantel *(Item 4)
140 Fire Clay Brick (Item 5)
¼ Cu. Yds. Crushed Stone (Item 15)
3½ Cu. Yds. Sand (Items 10 & 14)
1150 Lbs. Lime (Item 9)
½ Bbls. Portland Cement (Item 13)
25 Lbs. Mortar Color (Optional)
50 Lbs. Fire Clay (Item 11)
56 Ft. 8x12 Flue Lining (Item 2)
1 Damper
1 Ash Dump
1 Cleanout Door
1 4x4″ Angle Iron 3′ 10″ Long
2 Sacks Fire Resistant Material.
24 Sq. Ft. Wire Mesh Hearth Reinforcing, 4′ 0″ x 6′ 0″.

*A few face brick should be added here, to compensate for eny breakage which may occur during delivery or on job.

## 68. STRUCTURAL TILE.

There is considerable variation in sizes of the tile of various manufacturers, especially is this true of corners, jambs and fractions. Obviously, no quantity tabulation could be made which would cover this field.

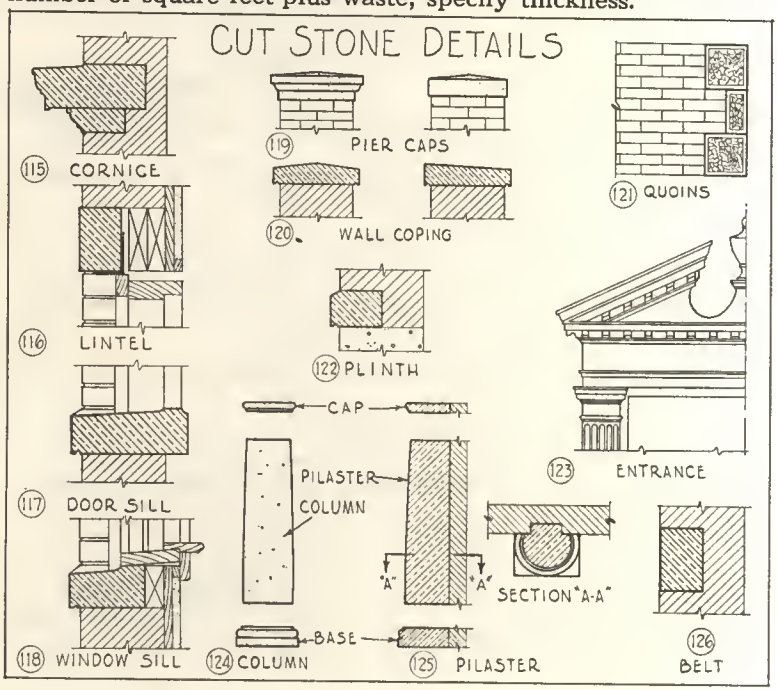
Obtain the catalog of the manufacturer whose product is specified. Simple instructions will be found therein for listing.

Likewise when tile is used for partitions, the manufacturers provide information for figuring same with mortar required. Standard size tile may be easily figured by computing the area of wall and dividing by the area of the exposed face of the tile.

To secure quantities of cement, sand and lime necessary to lay 1000 standard size tile with and without other masonry units, using standard mortar joints, refer to Page 113, Table No. 13.

## 69. FLAG STONES.

In some locations flagstones are sold by the ton with approximate thickness specified. Usually 20% is added for waste. For estimating purposes the usual procedure is to list number of square feet plus waste; specify thickness.



## 70. CUT STONE.

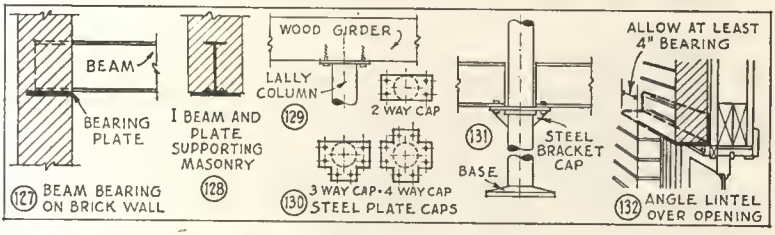
Where stone work is required on a job, the plans and specifications should be submitted to stone dealers for estimates.

In brick buildings limestone trim is often required. This may include sills, headers, caps, coping, brackets and various pieces of carved or ornamental stone.

To acquaint the estimator with the names and positions of various face stone and trim commonly used in small brick and stone dwellings we illustrate herein the name and position of the various items. See illustrations Page 82. Obtain estimates from local stone dealer.

## 71. STRUCTURAL STEEL.

List lintels, beams, plates, columns and all other structural steel as shown on plans or specifications. In listing give size, weight (or thickness of angles, bars, plates, etc.) and length. Standard or special connections should be listed with structural members to which they apply. In figuring length of steel angle lintels allow at least 4″ for each bearing. In figuring lengths of beams bearing in masonry walls allow ample bearing at each end and list bearing plates where specified or where necessary. List columns as shown on plans and of length shown, including caps and bases designated. Usually, for small buildings and residences, standard caps and bases are used. Supplementary drawings are usually furnished for any special steel framing, in which all dimensions and connections, plates, etc. are shown. See illustration below.




## 72. REINFORCING.

List reinforcing required for concrete floors, beams and lintels. Allow ample length to extend over bearings. Reinforcing rods are required in concrete lintels, beams, columns, steps, slabs, etc. Fabric or wire mesh reinforcing also can be used in slabs. In listing rods give quantity, kind, size and lengths. In listing fabric give number of square feet, weight, mesh and kind required.

## STEEL SASH, COAL CHUTES, ETC.

**73. CELLAR SASH AND FRAMES.**

List number steel cellar sash and frames required, giving make, number and size of lights. List lights of glass separately, giving size, strength and kind.

**74. CASEMENT SASH AND FRAMES.**

Casement sash vary according to the manufacturer. List quantity of each complete unit according to manufacturer's number. List glass separately, giving size, strength and kind.

**75. COAL WINDOW.**

List according to make, size and design.

**76. COAL CHUTE.**

List according to make, size and design.

**77. STEEL AREAWAY WALLS.**

State whether rectangular or half circle. Give projection, length, depth and gauge of metal.

## ORNAMENTAL IRON

**78. CHIMNEY ANCHOR.**

Furnish sketch of design; give overall dimensions and size of all members.

**79. ORNAMENTAL IRON STAIRWAY.**

List ornamental iron stairway according to plans and details. Actual dimensions to be taken from building.

**80. RAILINGS.**

Furnish sketch of plan and design; indicate horizontal dimensions, height, size and spacing of all members.

**81. IRON GRILLS.**

Furnish sketch of plan and design; indicate horizontal dimensions, height, size and spacing of all members.

**82. GRATES AND AREA GUARDS.**

Furnish sketch of plan and design; indicate dimensions, size and spacing of all members.

**83. BRACKETS.**

Furnish sketch of design; give projection and drop; indicate size of all members.

**84. WINDOW GUARDS.**

Furnish sketch of design; give projection and other dimensions, size and spacing of all members.

### 85. MISCELLANEOUS.

List any other ornamental iron work shown on plans such as porch columns, balustrades, iron grilled shutters, entrances, etc. giving sketch of design and necessary dimensions.

## PLASTERING AND STUCCO

### 86. PLASTER BASE.

List number of feet in area to be covered for all types of board, fabric and similar plaster bases.

To compute total area, measure lineal feet of all walls to be plastered; multiply this total by the ceiling height in feet. The result will be area in square feet. To this add the total square foot area of the ceiling, deduct one half the area of all openings over two feet in width, then divide by nine. This gives total number of square yards to be covered.

WOOD LATH:—Multiply the area in yards by 15 to obtain number of 48″ wood lath. To obtain number of bundles, divide by 50. Or estimate 30 bundles of 48″ wood lath for every 100 square yards.

METAL LATH:—Add 10% to number of feet in area to be covered; indicate whether black or galvanized; give description and gauge.

NAILS AND STAPLES:—For nails and staples for metal lath refer to Page 119, Table No. 18.

### 87. CORNER LATH.

The total number of lineal feet of interior angles of plaster will be the number of lineal feet of metal corner lath required.

### 88. CORNER BEADS.

The total number of lineal feet of exterior angles of plaster will be the number of lineal feet of corner bead required.

### 89. PLASTER.

Required yards of plaster is same as that of plaster base and is computed in same manner. For covering capacities of gypsum plasters refer to Page 114, Table No. 14.

In certain localities where there is sand in abundance, the plasterer may want to make his own mixture. Refer to Page 116, Table No. 16, for quantities required.

#### EXAMPLE

Assuming a house requires 500 square yards of plaster. Referring to Table No. 14, we find that, applied on wood lath, 31 sacks of Prepared Plaster are required per 100 Square yards. Therefore, 500 yards will require 5 x 31 or 155 sacks. Or if sand is available, a neat plaster may be used. Amount required is 5 x 10 = 50 sacks neat plaster; 5 x .75 = 3.75 cubic yards clean sharp sand. If prepared trowel finish is wanted, 5.75 x 5 = 28.75 or 29 sacks is required for 500 square yards.

CEMENT WAINSCOT:—Should be measured by the square yard. Refer to Page 114, Table No. 14, Keene's Cement.

CEMENT PLASTER:—Should be measured by the square foot or square yard. Refer to Page 115, Table No. 15. Usually used over boilers, in utility rooms and for garage walls and ceilings.

**90. SAND.**

For sand required in Gypsum Plasters, refer to Page 114, Table No. 14, which gives the amount required to mix with neat plaster for various bases. Refer to example on Page 85.

**91. PRECAST MEMBERS.**

List lineal feet together with all angles and ornaments; give size and stock number or sketch.

**92. COLOR.**

Mineral colors are different strengths, depending upon the manufacturer. To list quantity required, refer to data of manufacturer whose product is to be used.

**93. STUCCO BASE.**

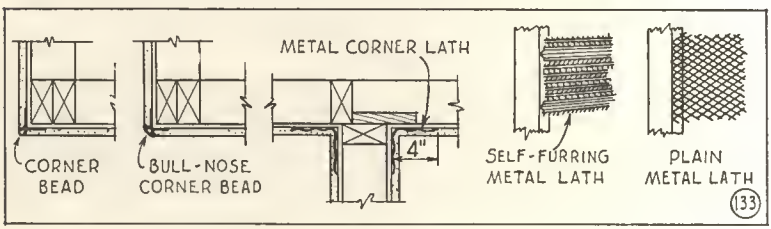
Compute actual area to be covered. Where metal lath is used, add 10% to the number of square feet in area to be covered; indicate whether black or galvanized; give description and gauge.

**94. STUCCO.**

Compute area in square yards to be covered. For actual quantities required, refer to Page 116, Table No. 17, which gives quantities necessary for 100 square yards on various bases for two and three coat work.

**95. STUCCO COLOR.**

If mineral colors are to be mixed with the white cement on job for finish coat, an average of from 30 to 40 lbs. of coloring per 100 square yards should be listed.



# HARDWARE

**96. NAILS.**

Refer to Pages 117 to 122 inclusive, Table No. 18. List nails in kegs or pounds as may be most practical.

**97. ANCHORS.**

List anchors, whether wall plate anchors, joist anchors or wall plug anchors, according to make, size and spacing specified or indicated on plans. List any other special anchors which may be specified in same manner.

**98. JOIST HANGERS.**

List joist hangers according to make specified and joist size.

**99. SASH WEIGHTS.**

Window weights should total the weight of the window, two being used for each sash. The bottom sash of a check rail window of same dimensions and number of lights is slightly heavier than the top sash. These weights are actually adjusted when hanging the windows. The weights of window sash are often found in millwork manufacturer's catalogs, or refer to Catalog No. 40 Standard Lists published by National Door Manufacturers Assn., Inc.

SASH BALANCERS:—When used, specify the style and manufacturer and list the number required.

**100. SASH CORD.**

List a good grade of sash cord. Use sash chain or steel sash ribbon for windows having a total weight greater than 60 pounds. Twenty feet is required for an average window; there are 100 feet of cord to a hank; therefore, one hank is enough for five average windows.

**101. STRAP HINGES.**

The size of a strap hinge is its length when folded together. They are sometimes specified for batten doors, doors of outbuildings, gates, etc. List in number of hinges or by number of pairs.

**102. TEE HINGES.**

The size of tee hinges is given in two dimensions. The first dimension is the height of the mortised leaf, and the second dimension is the length of the strap. They are sometimes specified for batten doors, doors of outbuildings, gates, etc. List in number of hinges or by number of pairs.

**103. SAFETY HINGE HASPS.**

See Strap Hinges.

**104. METAL POST CAPS.**

Where required, list same number as number of girder posts, giving the cross-sectional dimensions of the post and width of girders resting on same.

**105. HARDWARE CLOTH.**

List by lineal feet specifying the width required. Allow for lapping and fastening. List gauge, mesh and kind of material.

SCREEN CLOTH:—See above.

**106. TRUSS RODS.**

Where shown on plans, list rods in pieces specifying length and diameter and whether thread ends are to be upset or ordinary. Specify diameter and thickness of washers required for each rod.

**107. SPLICE PLATES.**

Where girders or other dimension material is to be spliced, specify width, length and thickness of plates. Also number of bolts required, giving lengths and diameters. A sketch should accompany list on these items.

**108. BOLTS.**

List number of bolts required, specifying length and diameter; also size and thickness of washers if required.

**109. CELLAR SASH SETS.**

List one cellar sash set for each wood basement sash.

**110. ATTIC OR GARAGE SASH SETS.**

List one attic or garage sash set for each wood sash.

**111. BUTTS.**

In listing specify 1 pair of 3½″x3½″ loose pin butts for each full sized 1⅜″ door; for 1¾″ doors list 1½ pr. 4″x4″ loose pin butts. Small butts for cabinets and small doors are made "light" and "heavy"; specify which are wanted. "Light" are generally used.

List butts in pairs giving the height first. Specify finish. Where outside doors swing out, specify loose joint or tight pin butts.

**112. SHOW CASE HINGES.**

List one pair brass show-case hinges with brass screws for outside door of early delivery cabinet.

**113. BUTT PLATES.**

List in sets as follows:—"1 Set of 2 Butt Plates" or "1 Set of 3 Butt Plates," and describe finish and style.

DOOR KNOCKER:—List when specified or indicated. Give style and finish.

**114. DOUBLE ACTING DOOR SETS.**

List one double-acting door set for each double-acting door. Specify finish.

With double-acting door sets list 2 PUSH PLATES for each double-acting door, giving material and finish.

**115. DOOR LOCK SETS.**

List one mortise lock set for each swinging door, except double-acting doors. Lock sets for outside and bathroom doors should be listed separately. Outside door lock sets, especially front doors, should be solid bronze with cylinder locks. Bathroom door sets are usually nickel or chromium plated on the bathroom side with the opposite side same finish as interior sets. Specify pattern and finish.

FRENCH DOOR LOCK SETS:—List quantity required and indicate whether for single or pair of doors and if rabbeted face.

SLIDING DOOR LOCK SET, TRACK & HANGER:—List one set sliding door hardware for each opening, indicating whether single door or pair; give width of complete opening, thickness and approximate weight of door.

**116. BLIND HINGES AND FASTENERS.**

List one set of blind hinges and fasteners for each pair of blinds. Likewise list one set of blind hinges and fasteners for each single blind.

**117. MORTISE DOOR BOLTS.**

List one mortise door bolt for outside doors on which an additional lock is wanted which can be operated only from the inside of the building. Specify pattern and finish.

**118. FLUSH BOLTS.**

List one top and one bottom flush bolt for each door in a pair, triple or quad which is to be held stationary part of the time. Specify size, pattern and finish.

**119. SPRING BOLTS.**

When plain rail windows are shown on plans, it requires 4 spring bolts for each window, 2 for the upper and 2 for the lower sash. List total number required.

**120. DOOR CHECKS.**

List door checks as may be required. These are seldom used in the average residence. Specify pattern and finish. Give size and thickness of door.

**121. CHAIN DOOR FASTENERS.**

List one chain door fastener for each exterior door in first story or as may be required. Specify finish.

**122. TRANSOM HARDWARE.**

TRANSOM BUTTS:—List one pair of transom butts for each transom. Specify finish.

TRANSOM LIFTS:—List one transom lift for each transom giving length of lift and size of transom. Specify finish.

TRANSOM CHAIN:—List transom chains when specified. Indicate finish. Either one or two chains may be required for each transom.

**123. SASH LOCKS AND LIFTS.**

SASH LOCKS:—List one sash fastener for each double hung window. Specify pattern and finish.

SASH LIFTS:—List one sash lift for each double hung window having a glass width of 30 inches or less, and two for wider windows. Where sash pull hooks are to be used, list one sash pull-plate for each double hung window. Specify pattern and finish.

**124. CASEMENT SASH HARDWARE.**

CASEMENT SASH FASTENERS:—List one set of casement sash fasteners for each opening specifying whether for single sash or pair and whether sash swing in or out. Specify style and finish.

It is advisable to use two casement sash fasteners for each casement sash which swings in and one for each casement sash which swings out. Such a fastener is the most satisfactory hardware for the inside door of the early delivery cabinet and the door of the soiled clothes bin. It may also be used on clothes chute doors.

CASEMENT ADJUSTERS:—List one casement adjuster for each casement sash, except those which are stationary. A friction adjuster is best adapted for sash that swing in. A concealed type opener is satisfactory for sash that swing out. Specify pattern and finish.

**125. DRAWER PULLS.**

List one drawer pull for narrow drawers and two for wide drawers. Specify pattern and finish.

**126. CUPBOARD TURNS.**

List one cupboard turn for each single and for each pair of cupboard doors. Specify pattern and finish.

**127. ELBOW CATCHES.**

List one elbow catch for each pair of cupboard doors. Not needed for single doors.

**128. CABINET DOOR KNOBS.**

List one door knob for each cabinet door. Specify size, pattern and finish.

**129. DRAWER KNOBS.**

List one drawer knob for each clothes chute door and for very small drawers. Specify size, pattern and finish.

**130. FRICTION BOLTS.**

List one friction or bullet catch for each clothes chute door and other small doors.

**131. BASE KNOBS.**

List one base knob for each swinging door. Floor knobs should be used for doors that do not swing back to the wall. Specify pattern and finish.

**132. STOP SCREWS AND WASHERS.**

When specified list thirteen stop-screws and washers for each window and fifteen for each door. These can be most economically purchased in boxes containing one gross. Specify finish.

**133. HAND RAIL BRACKETS.**

List two hand rail brackets for each short hand rail and three for long rails. Specify pattern and finish.

**134. CLOTHES HOOKS AND HANGERS.**

CLOTHES HOOKS:—Clothes hooks are usually spaced 8 inches apart on all hook strips. List the total number required. Specify pattern and finish.

ADJUSTABLE CLOTHES HANGERS:—The length of the hanger including the pull lever should be 1 inch less than the depth of the closet. List each unit according to length, complete with all fittings.

**135. CLOSET POLE FERRULES.**

Where closet poles are used, list for each pole 1 pair of metal ferrules of diameter of clothes pole.

**136. MAIL BOX.**

List one built-in mail box. Specify size, make and finish.

**137. HOUSE NUMBERS.**

List the figures required for house number. Specify pattern and finish.

**138. SCREEN AND STORM DOOR SETS.**

List number of sets required and mention articles that the set is to include, such as latches, spring hinges, door closer, wire spring, hook and eye and door pulls. Specify finish and kind of metal. Indicate whether mortise or surface latch is wanted.

### 139. SCREEN AND STORM SASH HANGERS.

List the number of single hanger sets for windows having screens only. List the number of double sets for windows that have screens and storm sash. Basement screens and storm sash should be held in place with aluminum buttons applied with brass screws. List one triplicate set of aluminum numbers for marking all screens and storm sash.

### 140. SIDING CORNERS.

To find the number of siding corners required, total the length in inches of all building corners on surfaces covered with wood siding. Use the exposure of the siding as a divisor. To the quotient add 5% for waste. State width of siding.

### 141. CLOTHES LINE HOOKS.

List the number of clothes line hooks required. Specify make and finish.

### 142. GARAGE DOOR HARDWARE.

List one complete set of hardware for each garage door opening; specify make and pattern; give width of opening. State whether doors are swinging or sliding and give the number of sections used in each opening.

### 143. METAL THRESHOLDS.

List one metal threshold for each outside door when specified. Length is from inside of side casing to inside of side casing. Specify kind of metal.

### 144. SUNDRY HARDWARE.

Examine plans and specifications for sundry items of hardware, such as night latches, sash pull hooks, etc.

## SHEET METAL

### 145. METAL ROOFING.

Metal roofs may be either tin, zinc, copper, galvanized iron or special stamped or processed metals. The areas to be covered are computed in the same manner as for other types of roofing. Metal roofing is furnished in many different sized sheets and rolls; therefore, the actual size sheets to be used is usually determined by the kind of metal roofing and seam specified and the particular conditions under which the work is to be done. For estimating purposes give the exact area to be covered plus 10%, the kind, gauge or weight of metal to be used and type of seam.

If a flat roof with parapet is to be figured, an allowance of 1'0" should be made at sides and ends to permit flashing up the wall. If a pitch roof is to be figured, measurements taken should include any overhang. Deduct 50% of area of openings over 100 square feet but make no deductions for small openings as the allowance for cutting and flashing would offset this deduction. List in squares if area is 100 square feet or over and in square feet if area is less than 100 square feet.

**EXAMPLE:**

12 Squares of No. 26 Gauge galvanized iron, standing seam, complete with standard cleats, nails and solder.

This manner of listing should give the sheet metal contractor sufficient data. Plans to be referred to the local sheet metal contractor whenever possible.

## 146. RIDGE ROLL.

Measure length of ridges in lineal feet. This material is delivered in 10 foot lengths. Therefore, total lineal feet listed should always be in multiples of 10, such as 50, 60, 70, etc. Also specify gauge of metal if galvanized iron, kind of tin; or weight per square foot of copper. Give size of roll and width of apron in inches.

**EXAMPLE:**

80 Ft. 2" x 2½" Ridge Roll, 26 gauge galvanized iron.
or
80 Ft. 2" x 2½" Ridge Roll, 16 ounce copper.

If ridge and hip caps are used, indicate girth in inches.

HIP ROLL:—Figure and list in same manner as ridge roll.

HIP SHINGLES:—Figure lineal feet of hips and multiply by 3 which gives quantity of hip shingles necessary. Usual size 4" x 9"; priced by the hundred.

FINIALS:—If finials are indicated, list quantity in pieces.

## 147. TIN SHINGLES.

Compute lineal feet of intersections between wall and roofs. Multiply lineal feet by 3 which will give the quantity of tin shingles required. The size of tin shingles will be according to the size of siding used and the exposure of the roof shingles. Stock sizes are 2½" x 7", 5" x 7" and 7" x 10". For flashing an ordinary 8" x 12" chimney it requires 21 tin shingles 7" x 10"; other chimneys in proportion.

## 148. VALLEY TIN.

Delivered in rolls 14″ and 20″ in width and lengths of 15, 25, and 50 feet. 14″ valley tin is sufficient for ordinary house valleys; 20″ valley tin is usually used for built-in gutters, for cornice work, double flashing chimneys, etc. List same in rolls and give width.

## 149. GUTTER.

Measure length of gutters in lineal feet. Stock gutters such as eave trough or half round hanging gutters, moulded or box gutters and roof gutters are delivered in 10 foot lengths. Therefore, total lineal feet listed should always be in multiples of 10, such as 50, 60, 70, etc. Also specify gauge of metal if galvanized iron, kind of tin or weight per square foot of copper. The size of eave trough is indicated by the width of the opening; standard widths are 3½″, 4″, 4½″, 5″ and 6″. Sizes of molded and box gutters are given by the girth (which is the width of the sheet metal from which the gutter is made) and the width of the opening. Sizes of roof gutters are given by the girth and height of the roll.

GUTTER HANGERS:—List one gutter hanger for every three lineal ft. of gutter listed. No hangers required for roof gutters.

INSIDE AND OUTSIDE MITRES, END CAPS AND DROP OUTLETS:—List quantity of mitres (corners), end caps or closed ends and drop outlets as shown on plans and of same width, girth or size as gutters used.

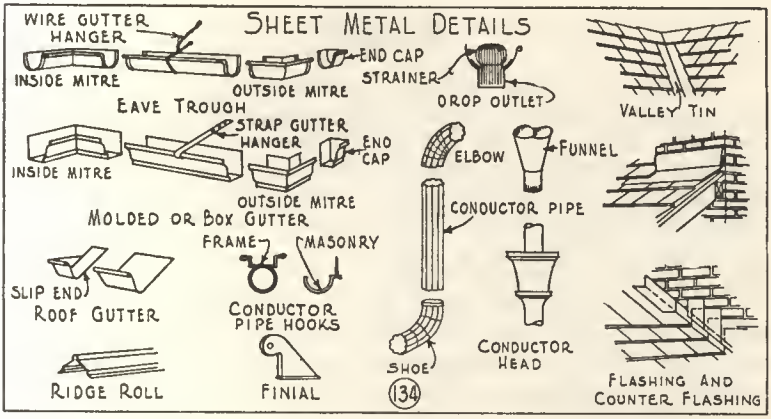
## 150. CONDUCTOR PIPE.

Measure lineal feet required and list in multiples of 10 ft In roofs having several different slopes, there will be several disconnected gutters. In that case a connecting conductor pipe is required from each. In cases where cisterns are used, figure ample conductor pipe to connect with same as shown on plans. The size of a conductor pipe is indicated by its diameter; standard sizes are 2″, 3″, 4″, 5″ and 6″. If conductor pipe is rectangular in section, give dimensions. Also specify gauge of metal if galvanized iron, kind of metal or weight per square foot of copper.

SIZE OF CONDUCTOR TO USE WITH GUTTER

| Width of Gutter | 3½″ | 4″ | 4½″ | 5″ | 6″ |
|---|---|---|---|---|---|
| Size of Cond. Pipe Required | 2″ | 2″ | 3″ | 3″ | 4″ |

ELBOWS, STRAINERS, FUNNELS AND SHOES:—List number of elbows, funnels and shoes as shown on plans of sizes to fit conductor pipe used. List same quantity of strainers as drop outlets.




CONDUCTOR PIPE HOOKS:—One-story buildings will require 3 to every conductor pipe; two-story buildings, 4 to every conductor pipe. It is safe to figure one conductor hook to every 4 feet. Specify whether to be fastened on wood walls or in brick walls as the kind to be used is different in each case.

CONDUCTOR HEADS:—List quantity as per plan, giving sizes and kind of metal.

ORNAMENTAL CONDUCTOR STRAPS:—List quantity as per plan, giving sizes and kind of metal.

**151. VENT STACKS.**

Specify size, length, size and location of openings and gauge.

**152. FLOWER BOX LINING.**

Specify size of flower box, number of drains required and kind of metal, gauge or weight per foot.

**153. CLOTHES CHUTE LINING.**

Specify size, length, size and location of openings and gauge.

**154. VENTILATORS.**

Give make, size and design. Size is usually in terms of diameter of the neck.

**155. TERMITE SHIELDS.**

Examine plans for termite shields. List termite shields for walls in lineal feet; also give girth necessary or design for shaping as per plan. List quantity of pier cap shields for individual piers according to shape as plans may require. Non-corrodible metal should be used.

# PAINT

When estimating quantities of paint and other materials for exterior or interior finishing, the actual surface to be painted should be taken from the plans. After the surfaces to be covered have been obtained as described below, refer to Page 123 to 125 inclusive, Table No. 19, for covering capacity of various paints, varnishes, etc. Compute actual areas according to the following instructions.

**156. EXTERIOR BODY PAINT.**

(BEVELLED SIDING, DROP SIDING AND SHINGLED WALLS). Compute actual area in square feet of all walls and gables to be painted and add 10%. Make no deductions for openings unless 100 sq. feet or over.

(OTHER WOOD WALLS, STONE AND CEMENT WALLS, PORCH FLOORS, CEILINGS, BULKHEADS AND OTHER PLAIN SURFACES TO BE PAINTED). Compute actual area in square feet. Make no deductions for openings unless very large.

BRICK WALLS:—For brick walls with raked, stripped or extruded joints, add 1/3 to the flat area. For skintled brick add 1/2 to the flat area.

DORMERS:—Compute each dormer at approximately 100 sq. ft. exclusive of windows.

**157. SHINGLE STAIN.**

Change squares of shingles to thousands in the following manner:

Roof Shingles:—squares x .8
Side Wall Shingles:—squares x .6

**158. EXTERIOR TRIM PAINT.**

Where trim paint is different shade than body, estimate as a general average 1/5 of total area for trim and 4/5 for body.

CORNICES:—Obtain actual girth including molding, facia, frieze and plancier and multiply by length of cornice which will give the number of square feet of surface to be painted.

PORCH RAIL AND BALUSTERS, LATTICE WORK AND GRILLS:—Multiply the area of one side by 3.

PORCH STEPS:—Add 2′0″ to width and multiply this figure by double the number of risers.

PORCH COLUMNS AND PILASTERS:—Multiply the girth of the column by the height which equals square feet of surface.

DOOR FRAMES:—For frame buildings take the lineal feet around the frame and multiply by 1′0″. For brick frames figure only 2 sides and head.

OUTSIDE DOORS:—Figure area including the edges at approximately 22 square feet.

WINDOW FRAMES AND SASH:—Multiply the length by the width of the frame to obtain area of surface of frame and sash to be painted. Windows average about 35 sq. ft. including sash and frame; sash only, about 15 sq. ft.

STORM SASH:—Figure 15 sq. ft. for both sides.

BLIND OR SHUTTER PAINT:—Obtain the area of both sides of one blind. A pair of blinds will require twice the area of one, etc. Figure 35 sq. ft. as an average area for 1 pair rolling slat blinds.

### 159. SHEET METAL PAINT.

Obtain the area of flat roofs by multiplying width by length and including all exposed metal. For areas of pitched roofs refer to Page 127, Table No. 21 and Page 128.

CORRUGATED METAL:—Add 25% to flat area.

GUTTERS AND CONDUCTOR PIPE:—Obtain the girth or distance around the gutter or conductor pipe (which will vary from 1′0″ to 2′0″) and multiply by the lineal feet. This gives area of gutter or conductor pipe to be painted.

### 160. MINERAL PAINT.

ORNAMENTAL IRON AND RAILINGS:—Compute area of one side and multiply by 2½.

STRUCTURAL STEEL:—Figure actual area and add 25%.

### 161. FLOOR VARNISH OR PAINT.

Compute the actual area in square feet.

### 162. INTERIOR VARNISH, PAINT, ENAMEL, ETC.

For painted or enameled walls and ceilings compute the area in square feet deducting for all openings over 10 square feet.

WINDOW TRIM:—Area of a single side, 20 sq. ft.; mullion, 40 sq. ft.; triple 60 sq. ft.

WINDOW:—Area of one side of window only, 15 sq. ft.
Area of one side of window with trim, 35 sq. ft.

DOOR:—Area of one side of door only, 20 sq. ft.
Area of one side of door with trim, 35 sq. ft.
Area of two sides of door with trim, 70 sq. ft.

DOOR TRIM:—Area of one side, 20 sq. ft.

INTERIOR BASE:—Estimate as 1′0″ wide.

CHAIR RAIL, PICTURE MOLDING and all other INTERIOR MOLDINGS, not exceeding 4″ in width, should be be estimated as 6″ wide.

ALL INTERIOR MOLDINGS FROM 4″ TO 8″ IN WIDTH should be estimated as 12″ wide.

INTERIOR BEAMS should be figured at 25% wider than their exposed girth.

INTERIOR PANEL WORK should be figured at 20% more than actual area.

BUILT-IN BOOKCASES, CUPBOARDS, CABINETS, ETC.:—Multiply the front area by 5.

MANTELS (FLAT):—Figure front area only.

MANTELS (PROJECTING):—Multiply the front area by 2.

STAIRS (WITH TREADS AND RISERS THE SAME COLOR):—Add 1′0″ to width of stairway and multiply by twice the number of risers.

STAIRS (WITH TREADS AND RISERS OF DIFFERENT COLOR):—Add 2′0″ to the width of the stairway and multiply this figure by the number of treads for the tread area, and by the number of risers for the riser area.

STAIR RAILINGS:—Multiply area of one side by 2.

**163. RADIATOR PAINT.**

Height x length x 6 — area of 3 tube radiator.
Height x length x 7 — area of 4 tube radiator.
Height x length x 8 — area of 5 tube radiator.

## 164. GLAZING.

When listing the quantities of glass required, list each kind of glass separately, such as single strength, double strength, plate, ribbed glass, wire glass and mirrors as they are figured from different lists and take different discounts. All glass is figured from lists prepared by the different glass manufacturers which give prices and discounts. It is advisable that the estimator secure lists from the various manufacturers of plain window glass as well as manufacturers of special glass.

One pound of putty will set from 8 to 8½ lineal feet of glass or sash rabbet in 1 3/8″ wood sash and 7¼ to 7½ lineal feet of glass or sash rabbet when set in 1¾″ wood sash.

Glass set in doors, transoms, sidelights, etc., compute in the same manner.

### EXAMPLE:

An 8 x 12 — 12 Lt. 1⅜″ window contains 12 lights each having a rabbet in lineal inches of 2 x (8 + 12) or 40″. 12 x 40 = 480″. 480 ÷ 12 = 40 lineal ft. From the above mentioned rule one lb. of putty will set 8 to 8½ lineal ft. of 1⅜″ sash rabbet. Therefore, the amount of putty required to set the window is 40 ÷ 8 or about 5 lbs.

For steel sash, see manufacturers catalogs.

# ROOFING

*Flexible*

### 165. ASPHALT SHINGLES.

Obtain the actual area to be covered. Refer to Page 127, Table No. 21 and Page 128. List the number of squares for area to be covered. List the number of lineal feet of hips, ridges and valleys to be covered and figure same at 1′0″ wide. List number of squares of felt, if specified, equal to number of squares of shingles plus 10%. For nails required, refer to Page 122, Table No. 18.

### 166. CANVAS DECKING.

Compute the amount of canvas by adding the necessary amount for laps and turnup at sides. List by the square yard, giving the weight per foot.

NAILS:—Multiply yards of canvas by .12 to get required number of pounds ¾″ 12 gauge 7/16″ head galvanized nails.

### 167. BUILT-UP ROOFING.

For flat surfaces or with very little pitch. Compute the area to be covered including the lap at ends and sides. List the number of squares required, giving number of plys (or thicknesses of felt) according to specifications.

### 168. PREPARED ROOFING.

Compute the actual area to be covered. Refer to Page 127, Table No. 21 and Page 128. List the number of squares. Each roll of this roofing includes the laps, nails, and cement to lay one square. Give lineal feet of ridges and starters, computing same as 1′0″ wide. List number of squares of felt, if specified, equal to number of squares of prepared roofing listed, plus 10%.

## ROOFING (continued)

*Rigid*

NOTE:—Because of the different styles, standards and sizes it is advisable that the lister secure full information direct from the manufacturers' catalogs before listing the actual quantities of ASBESTOS, SLATE or TILE ROOFS. The instructions under the following headings should generally be used, subject to any further listing requirements of the manufacturers.

### 169. ASBESTOS SHINGLES.

Obtain the actual area to be covered. Refer to Page 127, Table No. 21 and Page 128. List in number of squares. Give lineal feet of starters, hips and ridges required. Nails should be included. List number of squares of felt, if specified, equal to number of squares of shingles listed, plus 10%.

### 170. SLATE ROOFING.

Compute the actual area to be covered. Refer to Page 127, Table No. 21 and Page 128. Add 6″ to the length of the rafter to allow for waste on main roof, and for each lineal foot of hips and valleys add one square foot for waste in cutting and fitting. Make no deductions of less than 20 square feet. For areas of more than 80 square feet deduct 20% less than actual area. Allow from 3% to 15% additional slate depending upon the amount of dormers, walls or other projections intersecting the roof. The sum of the above surfaces divided by 100 will give the number of squares required. List by the square. The quantity and size of nails depend upon the size of slate used. List number of squares of slaters felt equal to number of squares of slate listed, plus 10%. For nails refer to Page 122, Table No. 18.

### 171. TILE ROOFING.

Compute the area to be covered and add 5%. Refer to Page 127, Table No. 21 and Page 128. List in number of squares, including nails. Specify kind and style of tile and include all special tile required such as hips, hip starters, ridges, gable terminals, hip terminals, finials, eave closures, etc. List quantity of felt equal to roof area plus 10%.

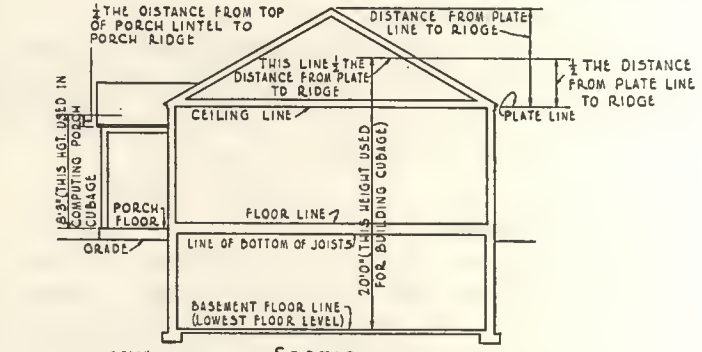
## Chapter 5.

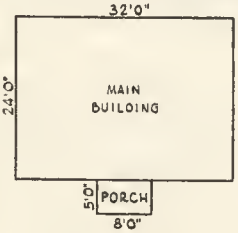
## DATA.

### *Cubic Foot Costs*

To find the cubic contents of a building, multiply the area by the average height. The height is measured from the basement floor to the average (½ of) roof height. Open porches should be estimated separately at one-half their contents.

## METHOD OF FIGURING CUBICAL CONTENTS




### EXAMPLE

1. AREA OF MAIN BUILDING 32'x24' = 768 SQ. FT.
2. MULTIPLIED BY HEIGHT USED IN COMPUTING CUBAGE (SEE SECTION) 20'
3. TOTAL MAIN BUILDING CUBAGE 15,360 CU. FT.
4. PORCH FLOOR AREA 8'x5' 40 SQ. FT.
5. MULTIPLIED BY HEIGHT 8¼ FT.
6. GROSS PORCH CUBAGE 330 CU. FT.
7. 50% OF GROSS PORCH CUBAGE CONSIDERED IN TOTAL 165 CU. FT.

TOTAL CUBAGE FOR HOUSE 15,525 CU. FT.

BUILDINGS WITHOUT BASEMENTS ARE COMPUTED BY TAKING THE HEIGHT FROM THE GRADE LINE TO A POINT ⅓ THE DISTANCE FROM THE PLATE LINE TO THE RIDGE, EXCEPT IN CERTAIN CASES WHERE A LARGE QUANTITY OF FOOTINGS AND OTHER UNDERGROUND WORK MAY ADD TO THE TOTAL COST OF THE JOB, THEN THE HEIGHT IS COMPUTED FROM THE BOTTOM OF THE FOOTING.

IN CASES WHERE A PORTION OF THE BASEMENT IS UNEXCAVATED, THE CUBAGE OF THIS PORTION IS NOT CONSIDERED AND ONLY THAT PORTION WHICH IS EXCAVATED IS INCLUDED IN THE CUBAGE. THE HEIGHT OVER THE UNEXCAVATED PORTION IS THEN TAKEN FROM THE BOTTOM OF THE 1ST FLOOR JOISTS.

ATTACHED GARAGES ARE FIGURED SAME WAY AS MAIN BUILDING AND GROSS CUBAGE USED.

## CUBIC FOOT COSTS (continued)

The costs per cubic foot will vary in different localities. In the schedule below a guide cost is given, i. e., the approximate cost per cubic foot for the buildings mentioned. These guide costs will serve as a basis until you have secured local costs. Costs should be revised once a year. While this book is devoted chiefly to residences, it is well for the estimator to have on hand data concerning other types of structures.

| KIND OF BUILDING | CONSTRUCTION | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Frame | | *Mixed House Construction | | Brick Veneer On Frame | | Ordinary | | Mill | | Fireproof | |
| | Gde. | Loc. | Gde. | Loc. | Gde. | Loc. | Gde. | Loc. | Gde. | Loc. | Gde. | Loc. |
| Residences One Story—No Basement | .40 | | .40 | | .42 | | .41 | | | | | |
| One Story—With Basement | .38 | | .38 | | .40 | | .39 | | | | | |
| 1½ Story—With Basement | .395 | | .40 | | .44 | | .43 | | | | | |
| Two Story—With Basement | .42 | | .44 | | .47 | | .45 | | | | | |
| Summer Cottages | .28 | | | | | | | | | | | |
| Garage Apartments | .40 | | .42 | | | | | | | | | |
| Garages | .20 | | | | | | | | | | | |
| Public Garages | | | | | | | | | | | | |
| Stores, One Story Without Basement | | | | | | | | | | | | |
| Stores, One Story With Basement | | | | | | | | | | | | |
| Stores, Basement, Offices and Apartments Above | | | | | | | | | | | | |
| Factories and Warehouses One Story | | | | | | | | | | | | |
| Factories and Warehouses, More Than One Story | | | | | | | | | | | | |
| Office Buildings | | | | | | | | | | | | |
| Schools | | | | | | | | | | | | |
| Hospitals | | | | | | | | | | | | |
| Hotels | | | | | | | | | | | | |
| Churches and Theaters | | | | | | | | | | | | |

*By Mixed House Construction is meant a combination of various materials in construction.

# ITEMIZED COST RATIOS

*(Frame Residences Only)*

Analysis of the itemized costs of a large number of similarly constructed frame houses reveals that the ratio of branch costs to total cost is approximately the same in every instance. The following ratios are average for the entire group studied and are useful in breaking down or itemizing estimates.

| KIND OF WORK | One Story House with Basement | | One Story House No Basement | | Story and a Half House (Rooms on 2nd floor) | | Two Story House | |
|---|---|---|---|---|---|---|---|---|
| | Aver. % | Local Figs. | Aver. % | Local Figs. | Aver. % | Local Figs. | Aver. % | Local Figs. |
| Lumber | 20.0 | | 22.0 | | 19.8 | | 19.4 | |
| Millwork | 15.7 | | 17.1 | | 15.9 | | 15.5 | |
| Hardware | 1.9 | | 1.9 | | 1.6 | | 2.0 | |
| Carpenter Labor | 14.7 | | 15.6 | | 16.3 | | 15.4 | |
| Excavating | 1.4 | | .5 | | 1.6 | | 1.1 | |
| Masonry | 17.3 | | 11.6 | | 14.7 | | 15.6 | |
| Plaster | 6.8 | | 7.8 | | 7.6 | | 7.4 | |
| Sheet Metal | 1.0 | | 1.1 | | .9 | | .9 | |
| Painting | 4.0 | | 4.2 | | 4.1 | | 4.3 | |
| Electric | 3.4 | | 3.4 | | 3.0 | | 3.4 | |
| Plumbing | 7.3 | | 7.5 | | 7.0 | | 7.6 | |
| Heating | 4.2 | | 4.6 | | 5.0 | | 5.3 | |
| Insulation | 2.3 | | 2.7 | | 2.5 | | 2.1 | |
| Total | 100.% | | 100.% | | 100.% | | 100.% | |

Blank columns are provided for insertion of ratios based on local conditions or market changes.

It is apparent that if the actual cost of any one of the major items is known, the approximate total cost and approximate cost of other branches may be determined.

## EXAMPLE

A tentative estimate is required of a two story frame house. From the plans the lumber may be listed and priced. If the total cost is found to be $990.00, that sum is approximately 19.4% of the total cost. Therefore, $990.00 ÷ .194 = $5103.09 total cost of house. $5103.09 x .155 = millwork cost. Other branches determined in the same manner.

## TABLE NO. 1 — CONCRETE MIXTURES

A cubic yard of concrete requires approximately the following quantities of cement, sand, gravel or broken stone according to the mixtures as designated. Based on using 1″ stone and under, dust screened out.

| Proportion of Mixture | Bbls. Cement | Cu. Yds. Sand | Cu. Yds. Crushed Stone or Gravel |
|---|---|---|---|
| 1—1½—3 | 1.85 | .42 | .84 |
| 1—2 —4 | 1.46 | .44 | .89 |
| 1—2 —5 | 1.27 | .39 | .97 |
| 1—2½—5 | 1.19 | .46 | .91 |
| 1—3 —5 | 1.13 | .48 | .80 |
| 1—3 —6 | 1.01 | .46 | .92 |
| 1—3 —7 | .91 | .42 | .97 |
| 1—4 —8 | .77 | .47 | .93 |

## TABLE NO. 2 — INTEGRAL WATERPROOFING

A cubic yard of concrete requires the following quantities of integral water proofing — according to the mixture of concrete specified.

| Concrete Mixture Proportions | Lbs. Waterproofing Per Cu. Yard Either Paste or Powder |
|---|---|
| 1 — 1½ — 3 | 15 Lbs. |
| 1 — 2 — 4 | 12 Lbs. |
| 1 — 2 — 5 | 11 Lbs. |
| 1 — 2½ — 5 | 10 Lbs. |
| 1 — 3 — 5 | 9 Lbs. |
| 1 — 3 — 6 | 8 Lbs. |
| 1 — 3 — 7 | 7¼ Lbs. |
| 1 — 4 — 8 | 6¼ Lbs. |

Multiply the total yards of concrete by the designated lbs. of waterproofing opposite mixture specified = total pounds.

## TABLE NO. 3 — CONCRETE BLOCKS

In thickness of wall, blocks are 6″, 8″, 10″, and 12″. Actual heights are 7½″ and length 15½″. Table gives number of standard 16″ cement blocks required for one course all around a wall:—

| Feet | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 44 | 46 | 48 | 50 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 16 | 19 | 22 | 25 | 28 | 31 | 34 | 37 | 40 | 43 | 46 | 49 | 52 | 55 | 58 | 61 | 64 | 67 | 70 | 73 | 76 | 79 | 82 |
| 8 | 19 | 22 | 25 | 28 | 31 | 34 | 37 | 40 | 43 | 46 | 49 | 52 | 55 | 58 | 61 | 64 | 67 | 70 | 73 | 76 | 79 | 82 | 85 |
| 10 | 22 | 25 | 28 | 31 | 34 | 37 | 40 | 43 | 46 | 49 | 52 | 55 | 58 | 61 | 64 | 67 | 70 | 73 | 76 | 79 | 82 | 85 | 88 |
| 12 | 25 | 28 | 31 | 34 | 37 | 40 | 43 | 46 | 49 | 52 | 55 | 58 | 61 | 64 | 67 | 70 | 73 | 76 | 79 | 82 | 85 | 88 | 91 |
| 14 | 28 | 31 | 34 | 37 | 40 | 43 | 46 | 49 | 52 | 55 | 58 | 61 | 64 | 67 | 70 | 73 | 76 | 79 | 82 | 85 | 88 | 91 | 94 |
| 16 | 31 | 34 | 37 | 40 | 43 | 46 | 49 | 52 | 55 | 58 | 61 | 64 | 67 | 70 | 73 | 76 | 79 | 82 | 85 | 88 | 91 | 94 | 97 |
| 18 | 34 | 37 | 40 | 43 | 46 | 49 | 52 | 55 | 58 | 61 | 64 | 67 | 70 | 73 | 76 | 79 | 82 | 85 | 88 | 91 | 94 | 97 | 100 |
| 20 | 37 | 40 | 43 | 46 | 49 | 52 | 55 | 58 | 61 | 64 | 67 | 70 | 73 | 76 | 79 | 82 | 85 | 88 | 91 | 94 | 97 | 100 | 103 |
| 22 | 40 | 43 | 46 | 49 | 52 | 55 | 58 | 61 | 64 | 67 | 70 | 73 | 76 | 79 | 82 | 85 | 88 | 91 | 94 | 97 | 100 | 103 | 106 |
| 24 | 43 | 46 | 49 | 52 | 55 | 58 | 61 | 64 | 67 | 70 | 73 | 76 | 79 | 82 | 85 | 88 | 91 | 94 | 97 | 100 | 103 | 106 | 109 |
| 26 | 46 | 49 | 52 | 55 | 58 | 61 | 64 | 67 | 70 | 73 | 76 | 79 | 82 | 85 | 88 | 91 | 94 | 97 | 100 | 103 | 106 | 109 | 112 |
| 28 | 49 | 52 | 55 | 58 | 61 | 64 | 67 | 70 | 73 | 76 | 79 | 82 | 85 | 88 | 91 | 94 | 97 | 100 | 103 | 106 | 109 | 112 | 115 |
| 30 | 52 | 55 | 58 | 61 | 64 | 67 | 70 | 73 | 76 | 79 | 82 | 85 | 88 | 91 | 94 | 97 | 100 | 103 | 106 | 109 | 112 | 115 | 118 |
| 32 | 55 | 58 | 61 | 64 | 67 | 70 | 73 | 76 | 79 | 82 | 85 | 88 | 91 | 94 | 97 | 100 | 103 | 106 | 109 | 112 | 115 | 118 | 121 |
| 34 | 58 | 61 | 64 | 67 | 70 | 73 | 76 | 79 | 82 | 85 | 88 | 91 | 94 | 97 | 100 | 103 | 106 | 109 | 112 | 115 | 118 | 121 | 124 |
| 36 | 61 | 64 | 67 | 70 | 73 | 76 | 79 | 82 | 85 | 88 | 91 | 94 | 97 | 100 | 103 | 106 | 109 | 112 | 115 | 118 | 121 | 124 | 127 |
| 38 | 64 | 67 | 70 | 73 | 76 | 79 | 82 | 85 | 88 | 91 | 94 | 97 | 100 | 103 | 106 | 109 | 112 | 115 | 118 | 121 | 124 | 127 | 130 |
| 40 | 67 | 70 | 73 | 76 | 79 | 82 | 85 | 88 | 91 | 94 | 97 | 100 | 103 | 106 | 109 | 112 | 115 | 118 | 121 | 124 | 127 | 130 | 133 |

EXAMPLE: A basement wall 20 x 30—73 blocks for one course all around.

Multiply 73 by the number of courses needed.

Deduct door and window openings.

## TABLE NO. 4 — MIXTURES FOR CONCRETE FLOORS

Quantities required to lay 100 square feet of floor.

| | 3" Floor with *½" Finish | | | 3" Floor One Course Monolithic | | | 4" Floor with *¾" Finish | | | 4" Floor One Course Monolithic | | | 5" Floor One Course Monolithic | | | 6" Floor One Course Monolithic | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mixtures | Yards Stone | Yards Sand | Bbls. Cem. | Yards Stone | Yards Sand | Bbls. Cem. | Yards Stone | Yards Sand | Bbls. Cem. | Yards Stone | Yards Sand | Bbls. Cem. | Yards Stone | Yards Sand | Bbls. Cem. | Yards Stone | Yards Sand | Bbls. Cem. |
| 1—1½—3 | .78 | .54 | 2.22 | .78 | .45 | 1.82 | 1.04 | .74 | 3.03 | 1.04 | .60 | 2.42 | 1.30 | .73 | 2.99 | 1.56 | .86 | 3.56 |
| 1—2 —4 | .83 | .65 | 1.85 | .83 | .47 | 1.28 | 1.10 | .76 | 2.25 | 1.10 | .62 | 1.64 | 1.38 | .76 | 2.44 | 1.65 | .89 | 2.44 |
| 1—2½—5 | .84 | .57 | 1.60 | .84 | .48 | 1.14 | 1.12 | .78 | 2.12 | 1.12 | .64 | 1.51 | 1.40 | .78 | 1.83 | 1.68 | .92 | 2.24 |
| 1—3 —5 | .75 | .60 | 1.55 | .75 | .50 | 1.15 | 1.00 | .81 | 2.15 | 1.00 | .66 | 1.53 | 1.25 | .81 | 1.88 | 1.50 | .97 | 2.23 |
| 1—3 —6 | .85 | .57 | 1.44 | .85 | .48 | 1.04 | 1.14 | .78 | 2.00 | 1.14 | .64 | 1.38 | 1.43 | .78 | 1.70 | 1.71 | .92 | 2.00 |

*Proportion of cement top finish, 1 part cement to 2 parts sand by volume.

Multiply the number of square feet of floor in hundreds by the units above to obtain actual quantities.

## TABLE NO. 5 — STANDARD BRICK

Quantity of Standard Brick (8″ x 2¼″ x 3¾″) Required *Per Superficial Square Foot* of Wall of Any Thickness With Various Mortar Joints.

| Thickness of Wall | | Quantity of Brick Required For Each Square Foot of Wall | | | | |
|---|---|---|---|---|---|---|
| | | ⅛″ Joint | ¼″ Joint | ⅜″ Joint | ½″ Joint | ⅝″ Joint |
| 4 Inches | Face or Veneer | 7½ | 7 | 6½ | 6-1/6 | 5⅞ |
| 8 Inches | 2 Brick Width | 15 | 14 | 13 | 12-1/3 | 11¾ |
| 12 Inches | 3 Brick Width | 22½ | 21 | 19½ | 18½ | 17⅝ |
| 16 Inches | 4 Brick Width | 30 | 28 | 26 | 24-2/3 | 23½ |
| 20 Inches | 5 Brick Width | 37½ | 35 | 32½ | 30-5/6 | 29⅜ |
| 24 Inches | 6 Brick Width | 45 | 42 | 39 | 37 | 35¼ |

## TABLE NO. 6 — BRICK PIERS

Quantity of Standard Brick (8″ x 2¼″ x 3¾″) Required *Per Foot of Height* For Standard Size Piers With Various Mortar Joints.

| Size of Piers Laid Flat | Quantity of Brick Required for Each Foot of Pier Height | | | | |
|---|---|---|---|---|---|
| | ⅛″ Joint | ¼″ Joint | ⅜″ Joint | ½″ Joint | ⅝″ Joint |
| 8″x8″ | 10⅛ | 9¾ | 9¼ | 9 | 8½ |
| 8″x12″ | 15¼ | 14½ | 13¾ | 13¼ | 12¾ |
| 12″x12″ | 23 | 21¾ | 21¼ | 19¾ | 19 |
| 12″x16″ | 30½ | 29 | 27½ | 26¼ | 25¼ |
| 16″x16″ | 40½ | 38½ | 36¾ | 35 | 33½ |
| 20″x20″ | 63¼ | 61¼ | 57¼ | 55 | 52¼ |
| 24″x24″ | 91 | 86½ | 82½ | 80 | 75¼ |

## TABLE NO. 7 — BRICK FOR CHIMNEYS

Quantities of Standard Brick (8″ x 2¼″ x 3¾″) Required Per Foot of Chimney Height. Computed For Standard Flues and Various Mortar Joints.

| Number of Flues | Size of Flues | Quantity of Brick Required for Each Foot of Chimney Height | | | | |
|---|---|---|---|---|---|---|
| | | ⅛″ Joint | ¼″ Joint | ⅜″ Joint | ½″ Joint | ⅝″ Joint |
| 1 | 8″x 8″ | 31 | 29 | 28 | 27 | 26 |
| 1 | 8″x12″ | 36 | 34 | 32 | 31 | 30 |
| 1 | 12″x12″ | 41 | 39 | 37 | 35 | 34 |
| 2 | 8″x 8″ | 51 | 48 | 46 | 44 | 42 |
| 2 | 8″x12″ | 59 | 56 | 53 | 51 | 48 |
| 2 | 12″x12″ | 69 | 65 | 62 | 60 | 57 |
| 2 | 4″x 8″ and 8″x 8″ | 46 | 44 | 42 | 40 | 38 |
| 2 | 4″x 8″ and 8″x12″ | 51 | 48 | 46 | 44 | 42 |
| 2 | 8″x 8″ and 8″x12″ | 56 | 53 | 51 | 49 | 46 |
| 2 | 8″x12″ and 12″x12″ | 64 | 60 | 58 | 55 | 53 |

## TABLE NO. 8 — MORTAR COLOR

Mortar Color required per 1000 Face Brick:

| Thickness of Joint | Pounds Required | | |
|---|---|---|---|
| | Black | Drab, Grey, Buff or Brown | Green, Amber, Salmon, Red and Terra Cotta |
| ⅛ | 25 | 40 | 50 |
| ¼ | 50 | 80 | 100 |
| ⅜ | 75 | 120 | 150 |
| ½ | 100 | 160 | 200 |
| ⅝ | 125 | 200 | 250 |

## TABLE NO. 9 — BRICK (Size Not Known Or Specified)

For Computation of Quantities of Brick When Size of Brick and Mortar Joints are Not Specified. It is Recommended that the Following Quantities be used.

| WALLS | | PIERS | | CHIMNEYS | | |
|---|---|---|---|---|---|---|
| Thickness Inches | Quantity of Brick Per Square Foot | Size Inches | Quantity of Brick Per Foot of Height | Number of Flues | Size of Flues | Quantity of Brick Per Foot of Height |
| 4″ | 7 | 8″x8″ | 10 | 1 | 8″x8″ | 30 |
| 8″ | 14 | 8″x12″ | 15 | 1 | 8″x12″ | 35 |
| 12″ | 21 | 12″x12″ | 22½ | 1 | 12″x12″ | 40 |
| 16″ | 28 | 12″x16″ | 30 | 2 | 8″x8″ | 50 |
| 20″ | 35 | 16″x16″ | 40 | 2 | 8″x12″ | 57½ |
| 24″ | 42 | 20″x20″ | 62½ | 2 | 12″x12″ | 67½ |
| 28″ | 49 | 24″x24″ | 90 | 2 | 4″x8″<br>8″x8″ | 45 |
| | | | | 2 | 4″x8″<br>8″x12″ | 50 |
| | | | | 2 | 8″x8″<br>8″x12″ | 55 |
| | | | | 2 | 8″x12″<br>12″x12″ | 62½ |

For quantities of mortar required refer to Page 111, Table No. 10.

For solid brick walls of large dimensions and fireplaces, compute quantity of brick required on a basis of 20 brick per cubic foot.

## TABLE NO. 10 — MORTAR FOR BRICKWORK

Quantities of Sand, Lime and Cement Necessary to Lay 1000 Brick With Mortar Joints of Various Thickness.

| | Mixture:— 1 Vol. Cement 2 Vols. Lime 9 Vols. Sand | | | Mixture:— 1 Vol. Cement 1 Vol. Lime 6 Vols. Sand | | | Mixture:— 1 Vol. Cement 3 Vols. Sand | | Mixture:— 1 Vol. Lime 3 Vols. Sand | |
|---|---|---|---|---|---|---|---|---|---|---|
| Thickness of Mortar Joint | Bbls. Cement | Cu. Yds. Sand | Lbs. Lime | Bbls. Cement | Cu. Yds. Sand | Lbs. Lime | Bbls. Cement | Cu. Yds. Sand | Lbs. Lime | Cu. Yds. Sand |
| ⅛ Inch | .13 | .17 | 40 | .19 | .17 | 30 | .38 | .17 | 60 | .17 |
| ¼ Inch | .25 | .33 | 80 | .38 | .33 | 60 | .75 | .33 | 120 | .33 |
| ⅜ Inch | .38 | .50 | 120 | .57 | .50 | 90 | 1.13 | .50 | 180 | .50 |
| ½ Inch | .50 | .67 | 160 | .75 | .67 | 120 | 1.50 | .67 | 240 | .67 |
| ⅝ Inch | .63 | .84 | 200 | .94 | .84 | 150 | 1.88 | .84 | 300 | .84 |

The above calculations are based on the following:

*Hydrated lime*—1 sack weighs 50 lbs., 1 cu. ft. = 40 lbs. and 40 sacks = 1 ton.
*Cement*—1 Bbl. = 4 sacks, 1 sack = 1 cu. ft. = 94 lbs.
*Sand*—Quantities based on loose dry measure 2700 lbs. per cu. yd.

The Above Table is Based on ½" Joints Requiring 18 Cu. Ft. of Mortar Per 1000 Brick with 10% Included for Waste.

## TABLE NO. 11 — MORTAR MIXTURES FOR CONCRETE BLOCK WALLS

### 10% ALLOWED FOR WASTE

Quantities of Cement, Sand and Lime required to lay up 100 blocks. Mixture, 1 Vol. Portland Cement to 2 Vols. Sand with 10% Lime Mortar added.

| Nominal Size of Block | ¼" MORTAR JOINT | | | ½" MORTAR JOINT | | |
|---|---|---|---|---|---|---|
| | Bbls. Cement | Yds. Sand | Lbs. Lime | Bbls. Cement | Yds. Sand | Lbs. Lime |
| 8x 6x16" | .28 | .078 | 6.67 | .555 | .155 | 13.3 |
| 8x 8x16" | .37 | .103 | 8.88 | .74 | .206 | 17.8 |
| 8x10x16" | .493 | .138 | 11.9 | .99 | .276 | 23.7 |
| 8x12x16" | .555 | .155 | 13.4 | 1.11 | .31 | 26.7 |

## TABLE NO. 12 — MORTAR MIXTURES FOR ROUGH STONEWORK

### 10% ALLOWED FOR WASTE

Multiply the cubic yards, cords or perches by the respective factors in the following table:—

| | Cement Mortar Mixture:—1 Vol. Cement to 3 Vols. Coarse Sand | | Lime Mortar Above Grade Mixture:—1 Vol. Cement, 1 Vol. Lime, 6 Vols. Sand | | |
|---|---|---|---|---|---|
| | Bbls. Cement | Cu. Yd. Sand | Bbls. Cement | Lbs. Lime | Cu. Yds. Sand |
| CU. YDS. | .75 | .333 | .375 | 60 | .333 |
| CORDS | 3.56 | 1.58 | 1.78 | 284 | 1.58 |
| PERCHES | .688 | .31 | .344 | 55 | .31 |
| For 100 Sq. Ft. 4" Random Face Stone Veneer | .406 | .18 | .203 | 32.4 | .18 |
| For 100 Sq. Ft. 6" Random Face Stone Veneer | .61 | .27 | .305 | 48.6 | .27 |

# TABLE No. 13
# MORTAR REQUIRED FOR STANDARD TILE WORK

MIXTURE:—1 Vol. Portland Cement to 3 Vols. Sand with 10% Lime Mortar added; 10% allowed for waste.

| Dimensions of Tile and Manner Laid | ¼ Inch Joint | | | ⅜ Inch Joint | | | ½ Inch Joint | | |
|---|---|---|---|---|---|---|---|---|---|
| | Bbls. Cement | Cu. Yds. Sand | Lbs. Lime | Bbls. Cement | Cu. Yds. Sand | Lbs. Lime | Bbls. Cement | Cu. Yds. Sand | Lbs. Lime |
| 1000 Pcs. Structural Clay Tile—2½x 3½x12 — 3½" wall or laid in bond with other units. | .79 | .33 | 13 | 1.18 | .50 | 20 | 1.57 | .66 | 26 |
| 1000 Pcs. Structural Clay Tile—5x4x 12—4" wall or laid in bond with other units. | 1.02 | .43 | 16 | 1.53 | .65 | 24 | 2.03 | .86 | 32 |
| 1000 Pcs. Structural Clay Tile — 5 x 6½ x 12—6½"wall or laid in bond with other units. | 1.67 | .70 | 27 | 2.50 | 1.05 | 41 | 3.33 | 1.40 | 54 |
| 1000 Pcs. Structural Clay Tile—5x8x 12—8" wall or laid in bond with other units. | 2.09 | .88 | 34 | 3.13 | 1.32 | 51 | 4.17 | 1.75 | 68 |
| 1000 Pcs. Structural Clay Tile — 8 x 6¼x12—8" wall or laid in bond with other units. | 2.22 | .93 | 36 | 3.33 | 1.40 | 54 | 4.44 | 1.86 | 71 |
| 1000 Pcs. Structural Clay Tile — 8 x 7⅝ x 12—8" wall or laid in bond with other units. | 2.36 | .99 | 38 | 3.54 | 1.48 | 57 | 4.72 | 1.97 | 76 |
| 1000 Pcs. Structural Clay Tile — 8 x 10½x12—8" wall or laid in bond with other units. | 2.73 | 1.15 | 44 | 4.10 | 1.72 | 66 | 5.46 | 2.29 | 88 |
| 1000 Pcs. Structural Clay Tile—8x12 x12 — 8" wall or laid in bond with other units. | 2.88 | 1.21 | 46 | 4.31 | 1.82 | 69 | 5.75 | 2.42 | 92 |
| 1000 Pcs. Structural Clay Tile — 12x 12x12—12" wall. | 4.35 | 1.83 | 70 | 6.53 | 2.75 | 105 | 8.70 | 3.66 | 140 |
| 1000 Pcs. Structural Cley Tile—3x12 x12—3" wall. | 1.06 | .45 | 17 | 1.59 | .67 | 26 | 2.12 | .89 | 34 |
| 1000 Pcs. Structural Clay Tile—4x12 x12—4" wall. | 1.44 | .61 | 24 | 2.16 | .91 | 36 | 2.88 | 1.21 | 47 |
| 1000 Pcs. Structural Clay Tile—6x12 x12—6" wall. | 2.18 | .92 | 35 | 3.27 | 1.38 | 53 | 4.35 | 1.83 | 70 |
| 1000 Pcs. Structural Clay Tile—8x12 x12—8" wall. | 2.88 | 1.21 | 46 | 4.31 | 1.82 | 69 | 5.75 | 2.42 | 92 |

## EXAMPLE:

A Certain Wall Requires 1850 Clay Tile 12" x 12" x 12' —12" Wall. Mortar Joints To Be ½ Inch.

Therefore:

(1850 ÷ 1000) x 8.70 Equals 16.10 Bbls. Cement
(1850 ÷ 1000) x 3.66 Equals 6.77 Cu. Yds. Sand
(1850 ÷ 1000) x 1.40 Equals 259 Lbs. Lime.

## TABLE NO. 14
## COVERING CAPACITY OF GYPSUM PLASTER FOR INTERIOR WORK

Average quantities of various plasters in 100 lb. sacks required for 100 square yards of plaster; also cubic yards of sand necessary to mix with neat plaster.

| Plaster Base | Neat Plaster To be mixed with Sand | | Wood Fibre Plaster No Sand | Prepared Plaster Sanded | Bond Plaster |
|---|---|---|---|---|---|
| | 100 lb. Sacks of plaster | Cu. Yd. Sand | 100 lb. Sacks of plaster | 100 lb. Sacks of plaster | 100 lb. Sacks of plaster |
| Wood Lath | 10. | * .75 | 21. | 31. | 20. For Concrete Surface Only |
| Metal Lath | 16.7 | *1.25 | 34. | 50. | |
| Gypsum Lath | 8.5 | * .63 | 17. | 26. | |
| Brick and Clay Tile | 11. | † .81 | — | 40. | |
| Gypsum Tile | 8.16 | † .604 | — | 32. | |

*Sanded 1-2, equals 1 part of plaster to 2 parts of sand by weight.
†Sanded 1-3, equals 1 part of plaster to 3 parts of sand by weight.

Average quantities in 100 lb. sacks of finish plasters required to cover 100 square yards of surface.

| Gauging Plaster | Prepared Sand Float Finish | Prepared Trowel Finish | Keene's Cement |
|---|---|---|---|
| 1.25 Sacks mix with 1/8 Ton or 5-50 lbs. sacks of Hydrated Lime | 7.60 Sacks | 5.75 Sacks | 4.50 Sacks |

## TABLE NO. 15 — CEMENT PLASTER

Quantity of material required for 100 sq. ft. of cement plaster or cement mortar.

| MIXTURE | BBLS. CEMENT | | | CUBIC YARDS SAND | | | LBS. OF INTEGRAL WATERPROOFING | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1/2 Inch Thick | 5/8 Inch Thick | 3/4 Inch Thick | 1/2 Inch Thick | 5/8 Inch Thick | 3/4 Inch Thick | 1/2 Inch Thick | 5/8 Inch Thick | 3/4 Inch Thick |
| 1 — 1 | .75 | .844 | 1.125 | .111 | .139 | .167 | 6. | 7.5 | 9. |
| 1 — 1½ | .60 | .675 | .90 | .133 | .167 | .20 | 5. | 6.25 | 7.5 |
| 1 — 2 | .50 | .563 | .75 | .143 | .179 | .215 | 4. | 5. | 6. |
| 1 — 2½ | .42 | .473 | .63 | .156 | .195 | .234 | 3.5 | 4.38 | 5.25 |
| 1 — 3 | .37 | .416 | .555 | .137 | .172 | .206 | 3. | 3.75 | 4.5 |

NOTE:—Integral waterproofing may be omitted from the mixture when not required.

## TABLE NO. 16
## QUANTITIES REQUIRED FOR MAKING PLASTER (OLD METHOD) TO COVER 100 SQUARE YARDS

| Kind of Work | Cu. Yds. Sand | Lbs. Lime | Hair Bu. or Lbs. | Bbls. Plaster Paris |
|---|---|---|---|---|
| 2 Coat Work | 1. | 520 | .75 or 6 lb. | .33 |
| 3 Coat Work | 1.5 | 650 | 1. or 8 lb. | .33 |

## TABLE NO. 17
## COVERING CAPACITY OF STUCCO FOR EXTERIOR WORK

Materials required for 100 square yards of Stucco of various thickness and number of coats and various stucco bases.

| 2 Coat Work ⅝ Inch Stucco | Bbls. Portland Cement | Cu. Yds. Sand | Bushels Hair | Bushels Fibre | Finish Coat | |
|---|---|---|---|---|---|---|
| | | | | | Bbls. White Cement | Cu. Yds. White Sand |
| On Wood Lath | 5.5 | 1.75 | 2. | 1. | 1.5 | .222 |
| On Brick, Tile, Cement or Cinder Blocks. | 5.5 | 1.75 | — | — | 1.5 | .222 |
| 3 Coat Work 3/4 Inch Stucco | | | | | | |
| On Wood Lath | 6. | 1.67 | 2. | 1. | 1.5 | .222 |
| On Metal Lath | 8.5 | 2.17 | 2. | 1. | 1.5 | .222 |
| On Brick, Tile, Cement or Cinder Blocks. | 6. | 1.67 | — | — | 1.5 | .222 |

If colored finished stucco is used it will require the same amount as the barrels of white cement for the finish coat and the same amount of sand.

## TABLE NO. 18 — NAILS

| Size and kind of Material | Board measure in ft. | Trade name | Lbs. of Nails Required 12″ centers | 16″ centers | 24″ centers | Length of nails | No. of nails to ea. bearing |
|---|---|---|---|---|---|---|---|
| 1 x 4 Boards and Shiplap | 1000 | 8d common | 60 | 48 | 30 | 2½″ | 2 |
| 1 x 6 Boards and Shiplap | 1000 | 8d common | 40 | 32 | 20 | 2½″ | 2 |
| 1 x 8 Boards and Shiplap | 1000 | 8d common | 31 | 27 | 16 | 2½″ | 2 |
| 1 x 10 Boards and Shiplap | 1000 | 8d common | 25 | 20 | 13 | 2½″ | 2 |
| 1 x 12 Boards and Shiplap | 1000 | 8d common | 31 | 24 | 16 | 2½″ | 3 |
| 1 x 4 D & M Blind Nailed | 1000 | 8d common | 30 | 24 | 15 | 2½″ | 1 |
| 1 x 6 D & M Blind Nailed | 1000 | 8d common | 20 | 16 | 10 | 2½″ | 1 |
| 1 x 8 D & M Blind Nailed and 1 Face Nail | 1000 | 8d common | 31 | 27 | 16 | 2½″ | 2 |
| 1 x 10 D & M Blind Nailed and 1 Face Nail | 1000 | 8d common | 25 | 20 | 13 | 2½″ | 2 |
| 1 x 12 D & M Blind Nailed and 1 Face Nail | 1000 | 8d common | 21 | 16 | 11 | 2½″ | 2 |
| 2 x 4 to 2 x 16 Framing | 1000 | 20d common<br>16d common<br>10d common | 20<br>10<br>8 | 16<br>10<br>6 | 10<br>6<br>4 | 4″<br>3½″<br>3″ | —<br>—<br>— |
| 3 x 4 to 3 x 14 Framing | 1000 | 60d common | 30 | 25 | 15 | 6″ | — |
| 2 x 6 D & M Flooring | 1000 | 20d common | 35 | 27 | 18 | 4″ | 1 |
| 2 x 8 D & M Flooring | 1000 | 20d common | 27 | 20 | 14 | 4″ | 1 |

## TABLE NO. 18 — NAILS (continued)

| Size and kind of Material | Board measure in ft. | Trade name | Lbs. of Nails Required | | | Length of nails | No. of nails to ea. bearing |
|---|---|---|---|---|---|---|---|
| | | | 12″ centers | 16″ centers | 24″ centers | | |
| 1 x 4 Drop Siding | 1000 | 7d siding | 45 | 35 | — | 2¼″ | 2 |
| 1 x 6 Drop Siding | 1000 | 7d siding | 30 | 25 | — | 2¼″ | 2 |
| 1 x 8 Drop Siding | 1000 | 7d siding | 23 | 18 | — | 2¼″ | 2 |
| ½ x 4 Bev. Siding | 1000 | 6d siding | 23 | 18 | — | 2″ | 1 |
| ½ x 6 Bev. Siding | 1000 | 6d siding | 15 | 13 | — | 2″ | 1 |
| ½ x 8 Bev. Siding | 1000 | 6d siding | 12 | 10 | — | 2″ | 1 |
| ¾ x 10 Bev. Siding | 1000 | 7d siding | 45 | 35 | — | 2¼″ | 2 |
| ¾ x 12 Bev. Siding | 1000 | 7d siding | 60 | 50 | — | 2¼″ | 3 |
| ¾ x 4 Ceiling | 1000 | 8d Finish | 18 | 14 | 9 | 2½″ | 1 |
| ½ to ⅝″ Ceiling | 1000 | 6d Finish | 11 | 8 | 6 | 2″ | 1 |
| ⅞″ Finish Lumber | 1000 | 8d Finish | 25 | 12 | 13 | 2½″ | 2 |
| 1⅛″ Finish Lumber | 1000 | 10d Finish | 12 | 10 | 6 | 3″ | 2 |
| 1 x 3 Flooring, soft wood | 1000 | 8d Floor Brads | 42 | 32 | 21 | 2½″ | 1 |
| 1 x 4 Flooring, soft wood | 1000 | 8d Floor Brads | 32 | 26 | 16 | 2½″ | 1 |
| 1 x 6 Flooring, soft wood | 1000 | 8d Floor Brads | 22 | 18 | 11 | 2½″ | 1 |

## TABLE NO. 18 — NAILS (continued)

| Size and kind of Material | Board measure in ft. | Trade name | Lbs. of Nails Required 12″ centers | 16″ centers | 24″ centers | Length of nails | No. of nails to ea. bearing |
|---|---|---|---|---|---|---|---|
| 3/8 x 1½″ Flooring, hard wood | 1000 | 4d Casing | 13 | 10 | — | 1¼″ | 1 |
| 3/8 x 2″ Flooring, hard wood | 1000 | 4d Casing | 11 | 8 | — | 1¼″ | 1 |
| 13/16 x 1½″ Flooring, hard wood | 1000 | 7d Casing | 27 | 20 | — | 2¼″ | 1 |
| 13/16 x 2¼″ Flooring, hard wood | 1000 | 7d Casing | 20 | 14 | — | 2¼″ | 1 |
| 1 x 2″ Furring on Brick Walls — 100 Lineal Ft. — 20d Cut Nails, Requires 5¼ Lbs. | | | | | | | |
| Base, per 100 Lineal Ft. | | 8d Finish | Requires 1 lb. 16″ on Centers. | | | | |
| Sides of Trim, per side of inside trim | | 4d Finish<br>6d Finish<br>8d Finish | Requires about ½ lb. Total | | | | |
| 48″ WOOD LATH, per 1000 lath | | 3d Fine | Requires 7 lbs. | | | | |
| METAL LATH, per 100 Sq. Yds.<br>or METAL LATH, per 100 Sq. Yds. | | 1″ Staples, Requires 12 lbs.<br>1⅛″ No. 12 Hook Head Nails, Requires 15 lbs. | | | | | |
| 3/8″ GYPSUM LATH, per 100 Sq. Yds. | | 1⅛″ x 13 Gauge — 5/16″ Heads Smooth Diamond Points. | Requires 10 lbs. | | | | |
| ¼″ PLASTER BOARD, per 100 Sq. Yds. | | 1″ x 13 Gauge — 5/16″ Heads Smooth Diamond Points. | Requires 10 lbs. | | | | |
| 5/16″ WALL BOARD, per 1000 Sq. Ft. | | 3d Flat Head Nail, Requires 5 lbs. | | | | | |
| ¼″ WALL BOARD, per 1000 Sq. Ft. | | 4d Flat Head Nail, Requires 9 lbs. | | | | | |
| 3/8″ WALL BOARD, per 1000 Sq. Ft. | | 4d Flat Head Nail, Requires 9 lbs. | | | | | |
| BATTENS will require ½ lbs. 4d Finish nails per 100 lineal feet.<br>For various styles of wallboards, see manufacturer's directions for nailing. | | | | | | | |

## TABLE NO. 18 — NAILS (continued)
## *SHINGLE NAILS FOR ROOF SHINGLES

*Approximate Number Required, and Weight of Hot Dipped Zinc Coated Nails Per Square of Random Width CERTIGRADE Shingles, for Weather Exposures Given.*

| 16-Inch CERTIGRADE | 5-Inch Exposure | | | 4½-Inch Exposure | | | 4-Inch Exposure | | | 3½-Inch Exposure | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Weight Lbs. | Weight Oz. | Number | Weight Lbs. | Weight Oz. | Number | Weight Lbs. | Weight Oz. | Number | Weight Lbs. | Weight Oz. |
| Grade 1 | 1030 | 2 | 0 | 1144 | 2 | 3½ | 1287 | 2 | 8 | 1471 | 2 | 14 |
| Grade 2 | 1310 | 2 | 9 | 1454 | 2 | 13½ | 1637 | 3 | 3 | 1872 | 3 | 10 |
| Grade 3 | 1545 | 3 | 0 | 1715 | 3 | 5 | 1931 | 3 | 12 | 2206 | 4 | 2 |
| **18-Inch CERTIGRADE** | **5½-Inch Exposure** | | | **5-Inch Exposure** | | | **4½-Inch Exposure** | | | **4-Inch Exposure** | | |
| Grade 1 | 933 | 1 | 13 | 1030 | 2 | 0 | 1144 | 2 | 3½ | 1287 | 2 | 8 |
| Grade 2 | 1190 | 2 | 5 | 1310 | 2 | 9 | 1454 | 2 | 13½ | 1637 | 3 | 3 |
| Grade 3 | 1348 | 2 | 11 | 1545 | 3 | 0 | 1715 | 3 | 5 | 1931 | 3 | 12 |
| **24-Inch CERTIGRADE** | **7½-Inch Exposure** | | | **7-Inch Exposure** | | | **6½-Inch Exposure** | | | **6-Inch Exposure** | | |
| Grade 1 | 716 | 1 | 14 | 760 | 2 | 0 | 784 | 2 | 1 | 852 | 2 | 4 |
| Grade 2 | 885 | 2 | 5 | 945 | 2 | 7½ | 974 | 2 | 9 | 1060 | 2 | 12 |
| Grade 3 | 955 | 2 | 8 | 1020 | 2 | 10½ | 1052 | 2 | 12 | 1245 | 3 | 0 |

Note: The above figures are for new roofs, on slat or solid decks. For over-roofing, as larger nails are used, increase weights of nails needed two-thirds for 16-inch and 18-inch shingles and three-fourths for 24-inch shingles. The above table allows a reasonable wastage of nails, and fewer nails may be needed on some jobs.

**From Certigrade Handbook of Red Cedar Shingles.* **See Page 122 for actual nail sizes.**

## TABLE NO. 18 — NAILS (continued)
## *SHINGLE NAILS FOR SIDE WALL SHINGLES

*Approximate Number Required, and Weight of Hot Dipped Zinc Coated Nails Per Square of Random Width CERTIGRADE Shingles When Applied to Side Walls, for Weather Exposure Given. Read Note Below Before Using Table!*

| 16-Inch CERTIGRADE | 5½-Inch Exposure | | | 6-Inch Exposure | | | 6½-Inch Exposure | | | 7-Inch Exposure | | | 7½-Inch Exposure | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Weight | | Number | Weight | | Number | Weight | | Number | Weight | | Number | Weight | |
| | | Lbs. | Oz. | | Lbs. | Oz. | | Lbs. | Oz. | | Lbs. | Oz. | | Lbs. | Oz. |
| Grade 1..... | 933 | 3 | 0 | 852 | 2 | 12 | 784 | 2 | 8 | 735 | 2 | 6 | 680 | 2 | 3 |
| Grade 2..... | 1190 | 3 | 12 | 1060 | 3 | 7 | 974 | 3 | 2 | 914 | 2 | 15 | 851 | 2 | 12 |
| Grade 3..... | 1348 | 4 | 5 | 1245 | 4 | 0 | 1150 | 3 | 11 | 1044 | 3 | 6 | 945 | 3 | 1 |

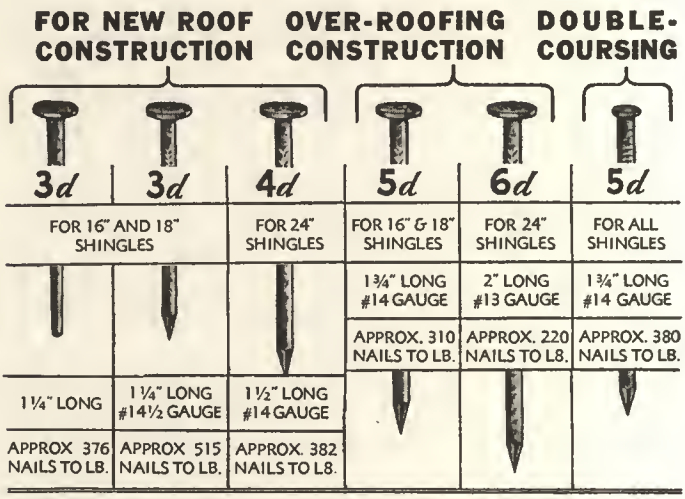
| 18-Inch CERTIGRADE | 6-Inch Exposure | | | 6½-Inch Exposure | | | 7-Inch Exposure | | | 7½-Inch Exposure | | | 8-Inch Exposure | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade 1..... | 852 | 2 | 12 | 784 | 2 | 8 | 735 | 2 | 6 | 680 | 2 | 3 | 628 | 2 | 0 |
| Grade 2..... | 1060 | 3 | 7 | 974 | 3 | 2 | 914 | 2 | 15 | 851 | 2 | 12 | 785 | 2 | 8 |
| Grade 3..... | 1245 | 4 | 0 | 1150 | 3 | 11 | 1044 | 3 | 6 | 945 | 3 | 1 | 845 | 2 | 11 |

| 24-Inch CERTIGRADE | 8-Inch Exposure | | | 9-Inch Exposure | | | 10-Inch Exposure | | | 11-Inch Exposure | | | 12-Inch Exposure | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade 1..... | 619 | 2 | 0 | 558 | 1 | 13 | 502 | 1 | 10 | 456 | 1 | 8 | 405 | 1 | 5 |
| Grade 2..... | 745 | 2 | 6 | 692 | 2 | 4 | 620 | 2 | 0 | 565 | 1 | 12 | 515 | 1 | 10 |
| Grade 3..... | 798 | 2 | 9 | 745 | 2 | 6 | 672 | 2 | 3 | 610 | 1 | 15 | 558 | 1 | 12 |

Note: The above figures are for new single-coursed side walls, using 5d. nails for 16-inch, 18-inch and 24-inch shingles. For over-walling, as 6d. nails are needed for 24-inch shingles, increase the corresponding weights one-half. For double-coursing with butt-nailing, small-headed 5d. nails are required, and therefore ten per cent may be deducted from weights as listed. A 12-inch exposure will require half as many nails as a 6-inch exposure, a 14-inch half as many as a 7-inch, and a 16-inch half as many as an 8-inch exposure.

**From Certigrade Handbook of Red Cedar Shingles.* **See Page 122 for actual nail sizes.**

## TABLE NO. 18 — NAILS (continued)




SQUARE CUT NAILS OF SAME LENGTH WILL ALSO GIVE SATISFACTORY SERVICE.

STANDARD "BOX" NAILS OF THE SIZES GIVEN WILL PROVE SATISFACTORY IF PROPERLY ZINC COATED OR MADE RUST-RESISTANT.

### PLYWOOD

Nails required to lay 1000 surface square feet.

| ¼" Thick | | 5/16" Thick | ⅜" Thick | ½" Thick | ⅝" Thick | ¾" Thick |
|---|---|---|---|---|---|---|
| 4d. Finish | 4d. Flat Head | 6d. Cement Coated | 6d. Cement Coated | 7d. Cement Coated | 8d. Cement Coated | 10d. Cement Coated |
| 5 Lbs. | *9 Lbs. | 15 Lbs. | 15 Lbs. | 17 Lbs. | 25 Lbs. | 40 Lbs. |

*When nailing ¼" plywood it will require about 5 lbs. per 1000 surface feet, of 4d finish nails or 9 lbs. of 4d flat head nails when battens are not to be used; and about 4½ lbs. of 4d flat head nails together with 3 lbs. of 4d finish nails when battens are used to cover joints spaced 4' 0" apart.

### ASPHALT SHINGLE NAILS

Requires 5 lbs. per square — ⅞" barbed roofing nails.

### SLATE ROOFING NAILS—(1¼" copper)

16" x 8" Standard Slate will require about 3 lbs. per square.
18" x 9" Standard Slate will require about 2½ lbs. per square.
20" x 10" Standard Slate will require about 2 lbs. per square.
24" x 12" Standard Slate will require about 1½ lbs. per square.

NOTE:—Where size of slate is not given figure 2¾ lbs. of nails per square as an average.

## TABLE NO. 19
## COVERAGE FOR PAINTS, VARNISH, FILLERS, OIL STAIN, ETC.

| MATERIAL | Square Feet To One Gallon | | |
|---|---|---|---|
| | 1 Coat | 2 Coats | 3 Coats |
| Aluminum Paint | 600 | 425 | |
| Barn Paint | 500 | 275 | |
| Brick Paint—White or Light Tints on Unsurfaced Walls | 225 | 110 | 75 |
| Brick Paint—Dark Tints on Unsurfaced Walls | 290 | 145 | 95 |
| Bronzing Liquid | 600 | 425 | |
| Canvas Deck Paint | 550 | 275 | |
| Enamel Base Coat (Prepared) | 425 | 240 | 165 |
| Enamels | 425 | 215 | 165 |
| Enamel (Interior White) | 475 | 265 | 190 |
| Factory—White | 500 | 300 | |
| Filler: Crack and Crevice About 4 lbs. 100 Sq. Ft. | | | |
| Liquid Filler | 550 | | |
| Paste—(2½ lbs. per 100 Sq. Ft. Reduce with Turpentine to Brushing Consistency) If stain is added to give desired color, then 1 gal. of the combination stain and filler will cover about— | 300 | | |
| Flat Black Interior | 700 | 400 | |
| Flat Wall Paint, White or Light Colors (On Smooth Finish) | 575 | 290 | 215 |
| Flat Wall Paint, Dark Colors (On Smooth Finish) | 725 | 365 | 240 |
| Flat Wall Paint, White or Light Colors (On Rough Sand Finish) | 475 | 265 | 190 |
| Flat Wall Paint, Dark Colors (On Rough Sand Finish) | 625 | 340 | 215 |
| Flat Wall Paint Size—Sand Float Finish | 300 | 150 | |
| Flat Wall Paint Size—Hard Finish | 500 | 300 | |
| Flat—White Undercoat | 500 | 300 | |
| Floor Paint—Interior Concrete | 350 | 200 | |

## TABLE NO. 19—(continued)

| MATERIAL | Square Feet To One Gallon | | |
|---|---|---|---|
| | 1 Coat | 2 Coats | 3 Coats |
| Floor Paint—Inside | 500 | 275 | |
| Galvanized Iron Primer | 700 | 450 | |
| Glazing Liquid | 525 | | |
| Graining Colors in Oil (About 1 lb. to 100 Sq. Ft. Reduced with Turpentine) | | | |
| Graphite Paint | 600 | 400 | |
| Ground Color | 400 | 225 | |
| Japan (Used in White Paints, Varnishes and Enamels as a drier — About a Tablespoon to a quart. Also used as a size for laying Gold Leaf.) | | | |
| Lawn and Porch Furniture Enamel | 450 | 250 | |
| Lead—Flat | 600 | 400 | |
| Linseed Oil | 600 | | |
| Mahogany Glaze | 600 | 400 | |
| Oil Colors. (From 1 ounce to 5 lbs. per gal. For Tinting Paint, Depending upon depth or shade desired.) | | | |
| Outside House Paint. White or Light Tints, Porous Woods | 475 | 255 | 190 |
| White or Light Tints, Close Grained Woods | 525 | 275 | 190 |
| Dark Colors, Greys, Tans, Etc. Porous Woods | 525 | 280 | 215 |
| Dark Colors, Greys, Tans, Etc. Close Grained Woods | 575 | 300 | 215 |
| Paint And Varnish Remover—(1 Gallon should remove about 200 Sq. Ft.) | | | |
| Shellac | 550 | 275 | |
| Screen Enamel (For Wood and Wire) | 500 | 300 | |
| Shellac | 500 | 275 | |
| Stain, Wood Tints | 750 | | |
| Stain, Shingle; (2 Gals. to 1000 Shingles for dipping 1 coat) (Brushing 1 coat after dipping, ½ Gal.) | | | |

## TABLE NO. 19—(continued)

| MATERIAL | Square Feet To One Gallon | | |
|---|---|---|---|
| | 1 Coat | 2 Coats | 3 Coats |
| Stain, Oil | 500 | 300 | |
| Stucco Paint—Combination Waterproofing and Color) | 300 | 175 | |
| Structural Steel Paint (Red Lead in Oil) | 650 | 350 | |
| Varnish, Finishing (or Spar)—Soft Wood Trim. | 475 | 215 | 165 |
| Finishing (or Spar)—Hard Wood Trim | 575 | 290 | 215 |
| Flat—Soft Wood Floors | 425 | 215 | 165 |
| Flat—Hard Wood Floors | 525 | 265 | 215 |
| Varnish Stain | 550 | 350 | |
| Waterproof Paint | 450 | 250 | |

## HOW TO MIX PAINTS

| | |
|---|---|
| Buff | —White, yellow ochre and red. |
| Chestnut | —Red, black and yellow. |
| Chocolate | —Raw umber, red and black. |
| Claret | —Red, umber and black. |
| Copper | —Red, yellow and black. |
| Dove | —White, vermillion, blue and yellow. |
| Drab | —White, yellow ochre, red and black. |
| Fawn | —White, yellow and red. |
| Flesh | —White, yellow ochre and vermillion. |
| Freestone | —Red, black, yellow ochre and white. |
| French Grey | —White, Prussian blue and lake. |
| Grey | —White lead and black. |
| Gold | —White, stone ochre and red. |
| Green Bronze | —Chrome green, black and yellow. |
| Green Pea | —White and chrome green. |
| Lemon | —White and chrome yellow. |
| Limestone | —White, yellow ochre, black and red. |
| Olive | —Yellow, blue, black and white. |
| Orange | —Yellow and red. |
| Peach | —White and vermillion. |
| Pearl | —White, black and blue. |
| Pink | —White, vermillion and lake. |
| Purple | —Violet, with more red and white. |
| Rose | —White and madder lake. |
| Sandstone | —White, yellow ochre, black and red. |
| Snuff | —Yellow and Van Dyke brown. |
| Violet | —Red, blue and white. |

The first named color is the principal ingredient; the others follow in the order of their importance. Exact proportions of each color must be determined by experiment with a smaller quantity. It is best to have the principal ingredient thick and the others thin when mixing.

## NO. 20 — RAFTER TABLE

To find the length of a rafter for any pitch roof, multiply the span by the factor on the same horizontal line in the column marked "Common Rafter" or "Hip or Valley Rafter", as the case may be:

| Rise in Inches per Foot of Run. | Equivalent Pitch | Common Rafter | Hip or Valley Rafter |
|---|---|---|---|
| 3″ | ⅛ | .515 | .719 |
| 4″ | 1/6 | .527 | .728 |
| 5″ | 5/24 | .542 | .738 |
| 6″ | ¼ | .559 | .751 |
| 7″ | 7/24 | .579 | .766 |
| 8″ | ⅓ | .601 | .783 |
| 9″ | ⅜ | .625 | .801 |
| 10″ | 5/12 | .651 | .822 |
| 11″ | 11/24 | .678 | .844 |
| 12″ | ½ | .707 | .867 |
| 13″ | 13/24 | .737 | .892 |
| 14″ | 7/12 | .768 | .918 |
| 15″ | ⅝ | .8 | .945 |
| 16″ | ⅔ | .833 | .973 |
| 17″ | 17/24 | .867 | 1. |
| 18″ | ¾ | .901 | 1.03 |
| 19″ | 19/24 | .936 | 1.06 |
| 20″ | 5/6 | .972 | 1.09 |
| 21″ | ⅞ | 1.01 | 1.13 |
| 22″ | 11/12 | 1.04 | 1.16 |
| 23″ | 23/24 | 1.08 | 1.19 |
| 24″ | Full | 1.12 | 1.23 |

The lengths obtained by this table do not include a projection over the plates. If rafters are to be continued over the plate, add twice the horizontal cornice projection to the span before multiplying by the factor above.

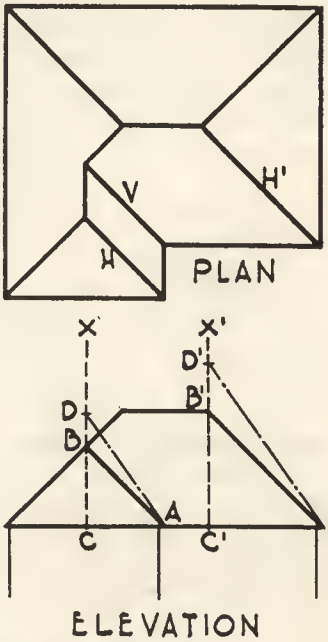
If the rise per foot of run contains a fractional part of an inch, use next larger number of inches.

## MEASURING TRUE LENGTHS OF HIP AND VALLEY RAFTERS FROM PLAN

*Another method of computing length of hip and valley rafters* is illustrated here. This is accurate and requires very little practice.

To find true length of hip rafter (H) or valley rafter (V). Draw line CX perpendicular to CA and through point B. Measure length AB on line CX; CD = AB. Then line AD equals true length of hip or valley rafters.

In the same manner length of hip rafter H' may be obtained.




## TABLE NO. 21 — ROOF AREAS

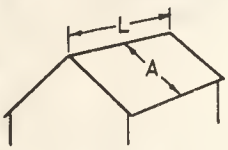
To the horizontal area at the eaves add the percentages in the table below to obtain the roof area, regardless of its shape or how it is cut up. If there is a deck, deduct its area plus the percentage used, then treat its actual area separately. If sections of the roof lie beyond the main eaves, figure separately and add.

| Rise in Inches Per Foot of Run | Equivalent Pitch | Percentage to Add |
|---|---|---|
| 3″ | 1/8 | 3 per cent |
| 4″ | 1/6 | 5½ per cent |
| 6″ | ¼ | 12 per cent |
| 8″ | ⅓ | 20 per cent |
| 9″ | ⅜ | 25 per cent |
| 12″ | ½ | 42 per cent |
| 15″ | ⅝ | 60 per cent |
| 18″ | ¾ | 80 per cent |

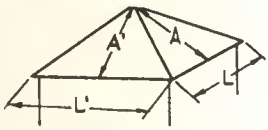
## ROOF AREAS

ALTERNATE METHOD:—Much used by experienced listers the following system of obtaining actual roof areas applies elementary mensuration as described and illustrated below. Measure dimensions A, B, C and L in feet. By substituting in the formulas given under each type of roof, actual areas in square feet can be obtained for that roof.

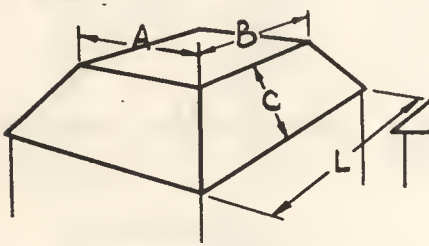

Shed Roof
Area = A x L



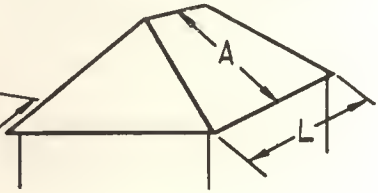

Gable Roof
Area = 2 x A x L



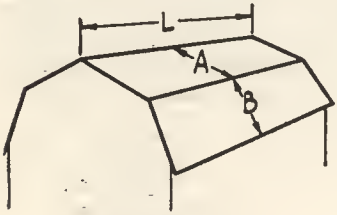

Hip Roof
Square Bldg.
Area = 2 x A x L
or 2 x $A^1$ x $L^1$



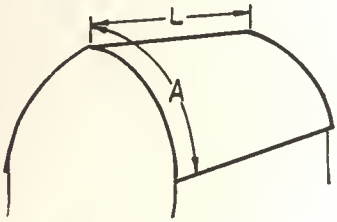

Mansard Roof
Area =
(2xAxC) + (2xCxL) + (AxB)




Hip Roof
Rectangular Bldg.
Area = 2 x A x L




Gambrel Roof
Area = 2 x L x (A+B)




Gothic Roof
Area = 2 x A x L

It may happen that the pitch of the sides of a hip or mansard roof are different than the end pitch, and when this occurs the areas of the sides and ends should be calculated separately and added together.

## SQUARE MEASURE

| Sq. Miles | Acres | Sq. Rods | Sq. Yards | Sq. Feet | Sq. In. |
|---|---|---|---|---|---|
| 1 | 640. | 102400. | 3097600. | 27878400. | ..... |
| ..... | 1. | 160. | 4840. | 43560. | 6272640. |
| ..... | ..... | 1. | 30.25 | 272.25 | 39204. |
| ..... | ..... | 0.0331 | 1. | 9.0 | 1296. |
| ..... | ..... | ..... | 0.111 | 1. | 144. |
| ..... | ..... | ..... | ..... | 0.00694 | 1. |

## LAND MEASURE

Acres x .0015625 = square miles.
Square yards x .000000325 = square miles.
Acres x .4840 = square yards.
Square yards x .0002066 = acres.
A section of land is 1 mile square and contains 640 acres.
A square acre is 208.71 feet at each side, or 220 x 198 ft.
A circular acre is 235.504 feet in diameter .
A circular ½ acre is 166.527 feet in diameter.
A circular ¼ acre is 117.752 feet in diameter.

## ONE SIDE OF SQUARE TRACT OF LAND CONTAINING

| | | | | | |
|---|---|---|---|---|---|
| 1/10 Acre, is | 66 ft.= | 4356 sq. ft. | 1 Acre, is | 208.7 ft.= | 43560 sq. ft. |
| ⅛ Acre, is | 73.8 ft.= | 5445 sq. ft. | 1½ Acre, is | 255.6 ft.= | 65340 sq. ft. |
| 1/6 Acre, is | 85.2 ft.= | 7260 sq. ft. | 2 Acre, is | 295.2 ft.= | 87120 sq. ft. |
| ¼ Acre, is | 104.4 ft.= | 10890 sq. ft. | 2½ Acre, is | 330 ft.= | 108900 sq. ft. |
| 1/3 Acre, is | 120.5 ft.= | 14520 sq. ft. | 3 Acre, is | 361.5 ft.= | 130680 sq. ft. |
| ½ Acre, is | 147.6 ft.= | 21780 sq. ft. | 5 Acre, is | 466.7 ft.= | 217800 sq. ft. |
| ¾ Acre, is | 180.8 ft.= | 32670 sq. ft. | 10 Acre, is | 660 ft.= | 435600 sq. ft. |

A Lot 25 feet by 125, contains nearly 1/14 of an acre; 50 feet by 218, ¼ of an acre.

Dividing the area by one side gives the other side if unknown. Thus a lot, if 25 ft. wide, in order to contain 1/10 of an acre, must be (4356 ÷ 25) = 174¼ ft. deep.

## MISCELLANEOUS INFORMATION

ASBESTOS (ORDINARY LOOSE):—Usually sold in 100 lb. bags. One bag covers 19 sq. ft. 1" thick.

BARRELS, CASKS:—*To find contents*, in gallons. RULE.—Multiply the square of the mean diameter by the depth and the product by .0034.

Find the capacity of a barrel whose mean diameter is 20 in., depth 32 in.
$20^2 \times 32 = 12800$; $12800 \times .0034 = 43\frac{1}{2}$ gal. Ans.

Cask, diameter, 12½ in., depth 20 in. $12\frac{1}{2}^2 \times 20 \times .0034 = 10\frac{5}{8}$ gal. Ans.

Note.—The U. S. Standard gallon contains 231 cubic inches. The English imperial gallon contains 277.274 cu. in., which is about 1-1/5 times 231. Hence, to change U. S. gal. to English gal., multiply by 5/6. 100 U. S. gal. (100 x 5/6) = 83⅓ Eng. gal. English gal. to U. S. gal., multiply by 1-1/5. 100 Eng. gal. (100 x 1-1/5) = 120 U. S. gal.

A can 7 in. in diam. and 6 in. deep holds 1 gal. A gal. of pure water weighs 8⅓ lbs.

## MISCELLANEOUS INFORMATION—(continued)

BRICK:—1 cu. ft. weighs 120 lbs. 1000 bricks closely stacked occupy about 56 cu. ft. 1000 old bricks cleaned and loosely stacked occupy about 72 cu. ft.

BUSHEL:—1 bushel = 2150.4 cubic inches.

CINDERS (BITUMINOUS):—1 cu. ft. weighs 65 lbs.

CISTERNS, BOILERS, ROUND:—*To find the capacity,* in gallons. RULE.—Multiply the square of the diameter by the depth (all in feet), and the product by 5⅞, for gallons; by .1865 for barrels.

Find capacity of a standpipe, diam. 8 ft., height 200 ft. $8^2 \times 200 = 12{,}800$

Instead of multiplying the cylindrical feet by 5⅞, multiply by 6 and diminish the product by ⅛ of the multiplicand.

Find contents of a cistern, diam. 10 ft., depth 13 ft. $10^2 \times 13 \times .1865 = 242\frac{1}{2}$ barrels nearly, (of 31½ gal.).

| | |
|---|---|
| | 6 |
| | 76,800 |
| ⅛ of 12,800 = | 1,600 |
| Ans. (gal.) | 75,200 |

COAL:—Hard coal averages about 80 lbs. per cu. ft. or 25 cu. ft. to a ton in the solid state. Chestnut size averages about 56 lb. per cu. ft. Hence, a bin of (4 x 3 x 3) 36 cu. ft., will hold a ton of 2000 lbs.

CORD WOOD:—A Cord of wood is a pile 4 feet wide, 4 feet high and 8 feet long (4 x 4 x 8) and contains 128 cubic feet. Hence:

*To find the Contents of a Pile of Wood* in cubic feet and cords. RULE.—Multiply length, width and height together, and divide by 128.

Find cubic feet in load, 4 by 2⅔ by 12.

$4 \times 2\frac{2}{3} \times 12 = 128$ cubic feet = 1 cord.

In a pile 4 by 4, 70 ft. long.

$4 \times 4 \times 70 = 1120 \div 128 = 8\frac{3}{4}$ cords. Ans.

CORN CRIBS:—Corn on the Ear, of good quality, measured when settled, will run 2¼ cu. ft. to bu. Inferior quality 2⅜ to 2½ cu. ft.

Find the capacity of a corn-crib 16 ft. long, 7½ ft. wide and 10 ft. high.

$16 \times 7\frac{1}{2} \times 10 = 1200$ cu. ft. $1200 \div 2\frac{1}{4}$ (9/4) $= 533\frac{1}{3}$ bu. Ans.

GRANARIES, WAGON-BEDS: — *To find contents* in bushels. RULE.—Multiply the number of cubic feet by .8. (For greater accuracy by .8036).

Find the contents of a granary or bin 14 ft. long, 7½ ft. wide and 6 ft. high. $14 \times 7\frac{1}{2} \times 6 = 630$ cu. ft.; $630 \times .8 = 504$ bu. Exact $630 \times .8036 = 506\frac{1}{4}$ bu. Of wagon-bed $10 \times 3 \times 1\frac{1}{2}$ ft. $10 \times 3 \times 1\frac{1}{2} = 45$ cu. ft. $45 \times .8 = 36$ bu. Ans.

A wagon-bed 3 ft. wide and 10 ft. long will hold 2 bushels for every inch in depth.

GRAVEL:—1 cu. ft. weighs 112 lbs. dry; 125 lbs. wet.

HAY, IN BULK:—1 cu. ft. = 4 lbs.
512 cu. ft. = 1 ton
8′ x 8′ x 8′ = 1 ton (approximately)

## MISCELLANEOUS INFORMATION (continued)

INSULATING CEMENT:—Sold in 50 lb. sacks. One sack covers 25 sq. ft. 1" thick.

SAND, CLEAN:—1 cu. ft. weighs 90 to 106 lbs. dry and loose.

STONE:—A perch of stone masonry is 16½ feet long, 1½ feet high and 1 foot thick (1 x 1½ x 16½) and contains 24¾ cubic feet.

*To find the Contents of a Wall,* in Perches. RULE:—Find number of cubic feet; then divide by 24¾ or multiply by .0404.

How many perches of stone in a 16 in. (1⅓ ft.), wall 6 ft. high, 98 ft. long?

1⅓ x 6 x 98 = 784 cu. ft. 784 x .0404 = 31.67 or 31⅔ perches. Ans.

TANKS, SQUARE:—*To find contents,* in gallons. RULE:—Multiply cu. ft. by 7½ (exact 7.48). For contents in barrels multiply cu. ft. by .2375.

Find the capacity of an oblong tank 10 ft. long, 3 ft. wide and 1⅔ ft. deep.

10 x 3 x 1⅔ = 50 cu. ft. x 7½ = 375 gals. 50 cu. ft. x .2375 = 11⅞ barrels.

WATER:—1 gallon = 231 cubic inches = 8⅓ lbs. distilled water.

1 cu. ft. water = 62½ lbs. = 7½ gallons.

To find the pressure in pounds per square inch of a column of water, multiply height of column in feet by .434.

31½ gallons = 1 barrel.

2 barrels = 1 hogshead.

## WEIGHTS OF FARM COMMODITIES

| MATERIALS | MEASUREMENTS | | WEIGHTS | | |
|---|---|---|---|---|---|
| | Floor Space Sq. Ft. | Contents, Cu. Ft. | Total Lbs. | Per Sq. Ft. | Per Cu. Ft. |
| Barrels Flour on End | 3.1 | 7.1 | 218 | 70 | 31 |
| Barrels Flour on Side | 4.1 | 5.4 | 218 | 53 | 40 |
| Corn in Bags | 3.6 | 3.6 | 112 | 31 | 31 |
| Corn Meal in Barrels | 3.7 | 5.9 | 218 | 59 | 37 |
| Hay Loose | .... | .... | ... | .. | 4 |
| Hay, Baled | .... | .... | ... | .. | 13 |
| Oats in Bags | 3.3 | 3.6 | 96 | 29 | 27 |
| Oats in Bulk | .... | .... | ... | .. | 32 |
| Wheat in Bags | 4.2 | 4.2 | 165 | 39 | 39 |
| Wheat in Bulk | .... | .... | ... | .. | 44 |

## CHECK LIST FOR FRAME GARAGE

When making material lists for garages, follow this list to avoid omissions.

1. Wall Plates or Sills
2. Studs Plates and Ties
3. Door Headers
4. Main Studs
5. Gable Studs
6. Corner Bracing
7. Rafters
8. Hip Rafters
9. Ridge Pole
10. Lookouts
11. Tie Beams
12. Roof Sheathing
13. Sheathing
14. Siding
15. Shingles for Roof or Roofing
16. Shingles for Walls
17. Outside Finish Lumber
18. Inside Finish Lumber
19. Door Frames
20. Window and Sash Frames
21. Door Jambs
22. Door Stops
23. Drip Cap
24. Windows and Sash
25. Doors
26. Exterior Moldings
27. Concrete Walls and Piers
28. Concrete Floor
29. Cinders
30. Anchor Bolts
31. Floor Drain
32. Nails
33. Butts or Hinges
34. Lock Sets
35. Complete Garage Door Equipment
36. Garage Window or Sash Hardware
37. Paint

## CHECK LIST FOR ALTERATIONS

Information for sketches and estimates, to be obtained at old buildings which are to be remodeled.

1. Size of lot
2. Locate building on lot
3. Points of compass
4. Outside dimensions
5. Porch dimensions
6. Bay dimensions
7. Height of first floor above grade
8. Size of outside studs
9. Spacing of outside studs
10. Outside stud height
11. Projection of cornice
12. Detail of cornice
13. Sketch of each elevation
14. Picture of each elevation

### BASEMENT

15. Sketch
16. Kind of walls
17. Thickness of walls
18. Locate cistern
19. Cistern dimensions
20. Room dimensions
21. Locate chimney
22. Size of chimney
23. Locate stack pipe
24. Locate floor drain
25. Locate laundry tubs
26. Locate water softener
27. Locate cistern pump
28. Locate furnace or boiler
29. Make and number of furnace or boiler
30. Locate range boiler
31. Size of range boiler
32. Locate hot water heater
33. Locate posts
34. Size of posts
35. Locate timbers

CHECK LIST FOR ALTERATIONS (continued)

36. Size of timbers
37. Dimensions on centers of exterior wall openings
38. Window sizes
39. Locate doors
40. Swing-way of doors
41. Door sizes
42. Clear story height
43. Width of stairway
44. Number of risers in each run
45. Number of treads in each run
46. Number of winders in each run
47. Height of risers
48. Width of treads
49. Size of first story joists
50. Spacing of first story joists

## FIRST STORY

51. Sketch
52. Room dimensions
53. Thickness of partitions
54. Locate bearing partitions
55. Locate chimney
56. Locate fireplace
57. Size of fireplace
58. Width of hearth
59. Locate toilet
60. Locate bathtub
61. Length of bathtub
62. Locate lavatory
63. Size of lavatory
64. Locate sink
65. Length of sink
66. Locate radiators or registers and C. A. returns
67. Height of each radiator
68. Number of sections in each radiator
69. Number of columns in each radiator
70. Style of radiator

CHECK LIST FOR ALTERATIONS (continued)

71. Locate cabinet work
72. Dimensions on centers of exterior wall openings
73. Window sizes
74. Locate doors
75. Swing-way of doors
76. Door sizes
77. Jamb height of each opening
78. Clear story height
79. Width of stairway
80. Number of risers in each run
81. Number of treads in each run
82. Number of winders in each run
83. Height of risers
84. Width of treads
85. Size of second story joists
86. Spacing of second story joists
87. Details of interior trim

## SECOND STORY

88. Sketch
89. Room dimensions
90. Thickness of partitions
91. Locate bearing partitions
92. Locate chimney
93. Locate fireplace
94. Size of fireplace
95. Width of hearth
96. Locate toilet
97. Locate bathtub
98. Length of bathtub
99. Locate lavatory
100. Size of lavatory
101. Locate radiators or registers and C. A. returns
102. Height of each radiator
103. Number of sections in each radiator
104. Number of columns in each radiator
105. Style of radiator
106. Locate cabinet work
107. Dimensions on centers of exterior wall openings

CHECK LIST FOR ALTERATIONS (continued)

108. Window sizes
109. Locate doors
110. Swing-way of doors
111. Door sizes
112. Jamb height of each opening
113. Clear story height
114. Width of stairway
115. Number of risers in each run
116. Number of treads in each run
117. Number of winders in each run
118. Height of risers
119. Width of treads
120. Size of attic joists
121. Spacing of attic joists

## ATTIC

122. Sketch
123. Locate purlins
124. Size of purlins
125. Locate chimney
126. Dimensions on centers of exterior wall openings
127. Window sizes
128. Jamb height of each opening
129. Height, floor to ridge
130. Height, floor to plate
131. Dimensions of roof deck
132. Size of roof deck joists
133. Spacing of roof deck joists
134. Size of roof rafters
135. Spacing of roof rafters
136. Roof pitch
137. Sketch of roof plan

## ELECTRIC WIRING, PLUMBING, HEATING AND INTERIOR TILE WORK

When it is the intention to carry out the work under definite contract, the plans and specifications for Electrical Work, Plumbing and Sewage, Heating, Ventilation and Interior Tile Work should be submitted to the local contractors who specialize in this work and who are familiar with local ordinance requirements and costs for complete installation.

Tentative or approximate costs, however, are very often required of the estimator in order that the complete cost of the home may be arrived at with a fair degree of accuracy. Therefore, the following methods of computation have been devised.

ELECTRIC WIRING:—For ordinary work such as required for dwellings, most electricians estimate the total cost on a basis of a certain price per outlet which includes all labor and material involved. Knob and tube work is very often used in the smaller towns and cities. In larger cities and urban districts the local ordinances require the wires to be run in rigid or flexible conduit which is more expensive than knob and tube work. In arriving at a cost it is customary to list the number of various outlets and price them at the cost per outlet prevailing in the local community. List outlets as follows:

Ceiling Outlets
Wall Brackets
Duplex Convenience Outlets
Special Purpose Convenience Outlets
Weatherproof Convenience Outlet
Single Switches
Three Way Switches
Drop Cords
Push Buttons
Buzzers
Bells
Transformer
Lighting Panel
Meter
Floor Outlets
Clock Outlet

The following are usually figured separately:

Service Wiring to Building
Mail boxes, bells and tubes
Electric Door Openers
Special Power Outlets

ELECTRIC FIXTURES:—The cost depends upon the kind and finish selected. Usually 60% to 80% of the cost of wiring will equal the cost of fixtures.

PLUMBING, SEWAGE, ETC.:—As very few general building contractors or estimators possess a working knowledge of the plumbing trade, it is difficult for them to prepare more than an approximate estimate on the various kinds of plumbing work. The cost of plumbing obviously depends upon the kind of fixtures and accessories specified. The cost of sewage depends upon the size of the building, local requirements, number of drains, etc. The cost of the water supply system depends upon the amount and kind of piping to the various fixtures, kind of valves and amount of leads, etc. A common method used to arrive at an approximate plumbing cost is to tabulate the number of fixtures in the dwelling such as water closets, lavatories, kitchen sinks, bath tubs, shower baths, laundry tubs, hot water tanks, heaters, etc., and estimate them at a certain price per fixture installed. These prices can be obtained from the local plumber. The cost of sewage, drainage and water system will amount to the same in most instances. Therefore, a rate for this class of work can be obtained by careful comparison of the plans and requirements with similar houses which have been erected under conditions which are as like as possible to the conditions under which the proposed house is to be erected.

It is advisable for the estimator to compile a table of rough plumbing, drainage and sewage costs for various types and sizes of dwellings. To these table costs it will be necessary to add the costs of the fixtures and accessories as specified or selected.

A list of costs for installing such fixtures as hot water tanks, heaters, etc. can be obtained from the local plumber. Do not overlook special requirements such as wells, cisterns and septic tanks.

HEATING:—The cost of a heating plant depends upon the system used, whether warm air, steam or hot water and whether the boiler and pipes are covered with asbestos covering. The installation of warm air is the cheapest, steam next and hot water most expensive. All of these systems are extensively used for the heating of residences. There are various methods of obtaining approximate costs for tentative estimating. The one commonly used, without going into detailed estimating, is to compute the cubical contents of all the livable quarters of the building. For a one-story building this is obtained by multiplying the floor area in square feet by the ceiling height. For a two-story building the cubical content is obtained by multiplying the floor area of the first floor by the height taken from the first floor to the ceiling of the second floor or in a story and a half building the actual cubic contents of the living quarters of both floors. Costs of heating depend upon climatic conditions. The following table will give the average approximate costs in cents per cubic foot for installing the various types of heating. The figures given were compiled by averaging the actual heating costs on a large number of houses, and pertain to average climatic conditions in the northern states. The estimator should obtain costs from local heating contractors, and in no instance should a contract be made before an accurate estimate has been obtained.

## COSTS GIVEN IN CENTS PER CUBIC FOOT

| Construction | Warm Air Heat | | Steam Heat | | Hot Water Heat | |
|---|---|---|---|---|---|---|
| | Average Cost | Local Cost | Average Cost | Local Cost | Average Cost | Local Cost |
| Frame | 3¼c | | 7c | | 8c | |
| 8" Brick | 3¼c | | 7c | | 8c | |
| 12" Brick | 3c | | 6½c | | 7¾c | |
| Brick Veneer | 3c | | 6½c | | 7¾c | |

When estimating warm air heating systems for houses costing up to $8000, economical AIR CONDITIONING UNITS are manufactured which can be installed with the warm air heating system at average prices from $175 to $250 extra, depending on the size of the building.

INTERIOR TILE:—All tile used for floors, wainscotings, hearths etc. are estimated by the square foot. Base, caps, nosings, etc. are figured by the lineal foot. Bath room tile accessories, such as towel bars, soap dish, paper holder, etc., are figured by the piece. The concrete base and preparation of the wainscote walls are considered as a part of the tile work and the price per square foot for walls and floors includes this preparation.

The cost of complete tile work depends upon the kind and quality selected. To secure an accurate estimate on tile work the plans and specifications should be submitted to the local tile setter.

## BUILDING CODES, HANDBOOKS AND CATALOGS

Much general information of value may be obtained from Building Codes and from Handbooks and Catalogs of various manufacturers and distributors.

Building Codes are veritable encyclopedias of building construction. Their study is recommended.

When special information is found in catalogs it is usually in an appendix. It is well to cultivate the habit of glancing through each catalog that comes to hand to ascertain the nature of the "useful information" contained therein.

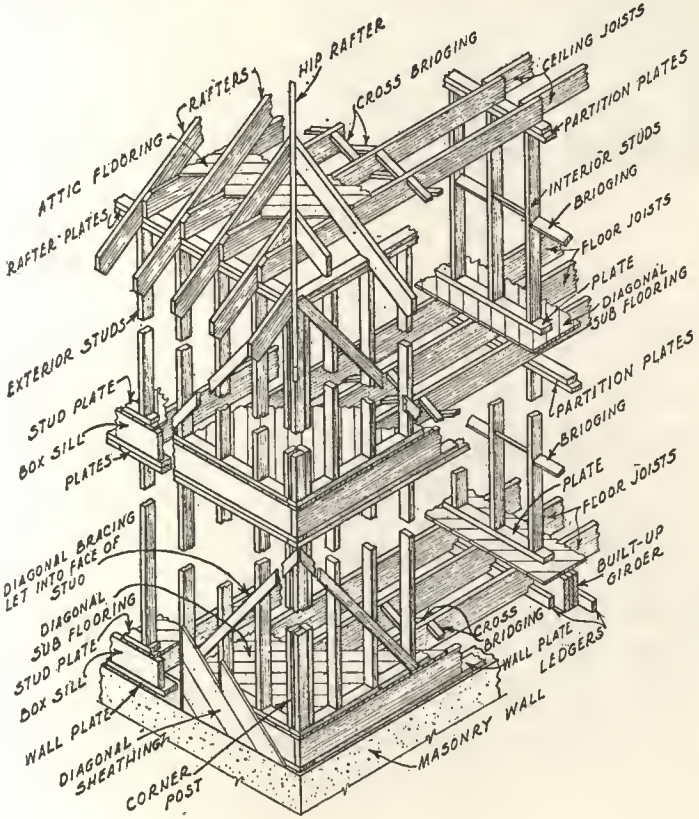
## Chapter 6

# TYPICAL FRAMING DRAWINGS

The following descriptive drawings will enable the estimator to quickly solve the construction problems pertaining to the framing of floors, ceilings, roofs and walls of dwellings. The illustrations show standard frame construction prevailing throughout the country, and the names designating the various members and their location are plainly indicated.

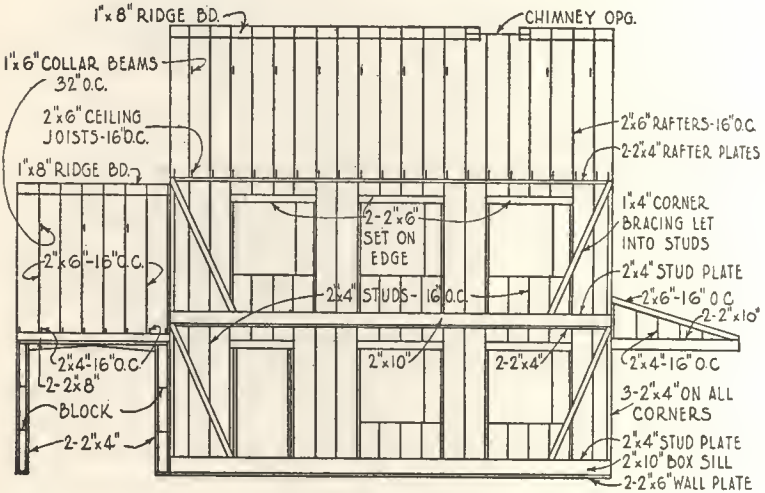
## PLATFORM OR WESTERN FRAME CONSTRUCTION

This construction is distinguished by independently framed floor platforms, the second and third floors being supported by studs of story height.



## PLATFORM FRAME CONSTRUCTION

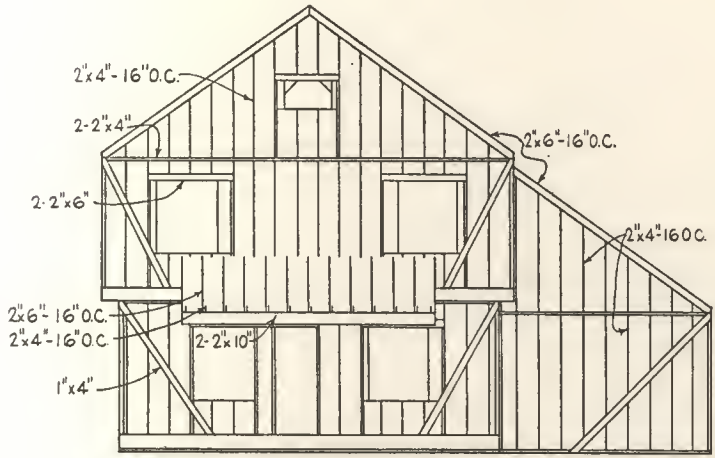
FRONT ELEVATION




FRONT FRAMING

## PLATFORM FRAME CONSTRUCTION

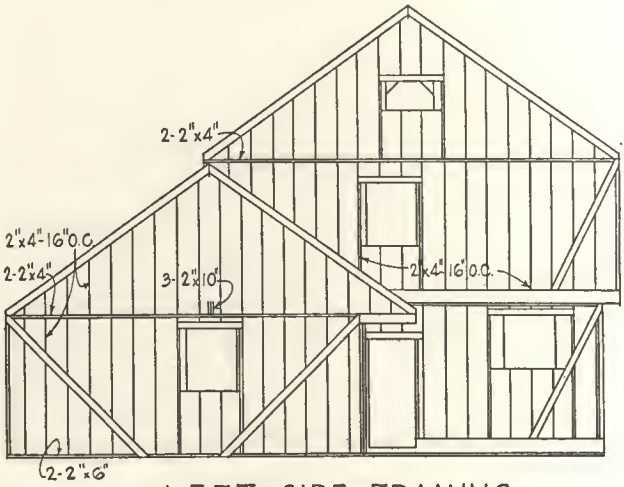
RIGHT SIDE ELEVATION




RIGHT SIDE FRAMING

## PLATFORM FRAME CONSTRUCTION

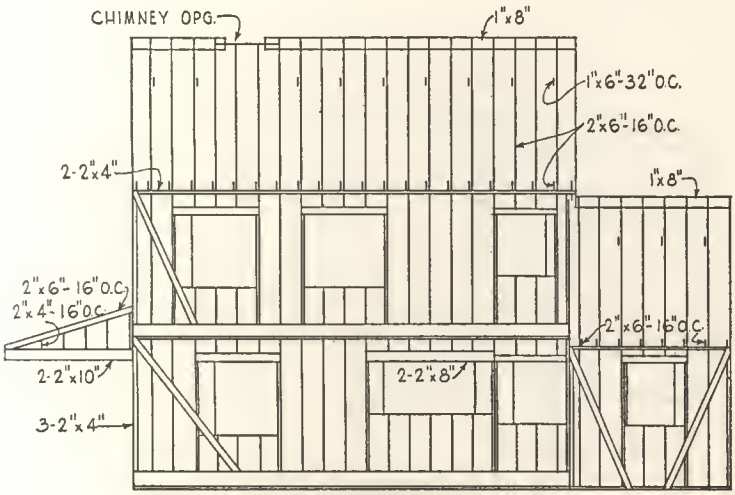
LEFT SIDE ELEVATION




LEFT SIDE FRAMING

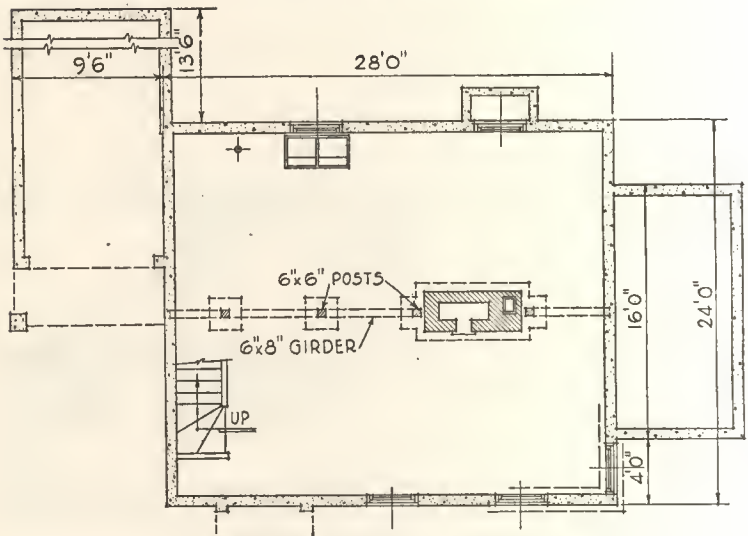
## PLATFORM FRAME CONSTRUCTION

REAR ELEVATION

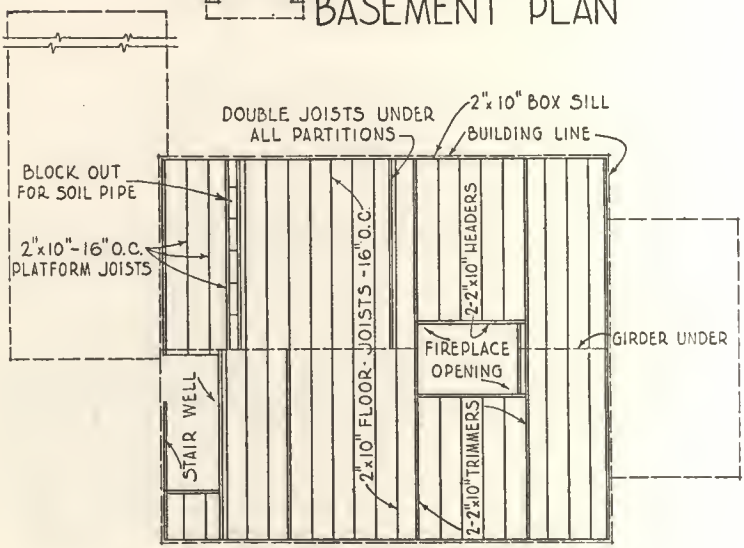



REAR FRAMING

## PLATFORM FRAME CONSTRUCTION

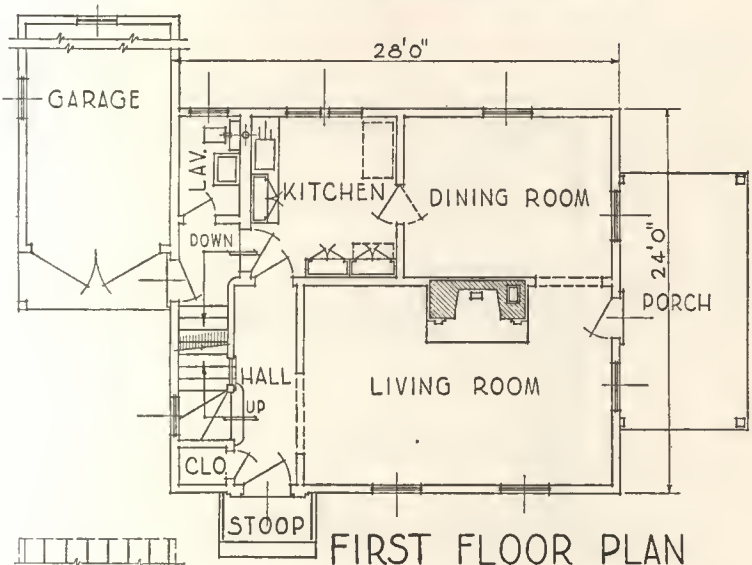



BASEMENT PLAN

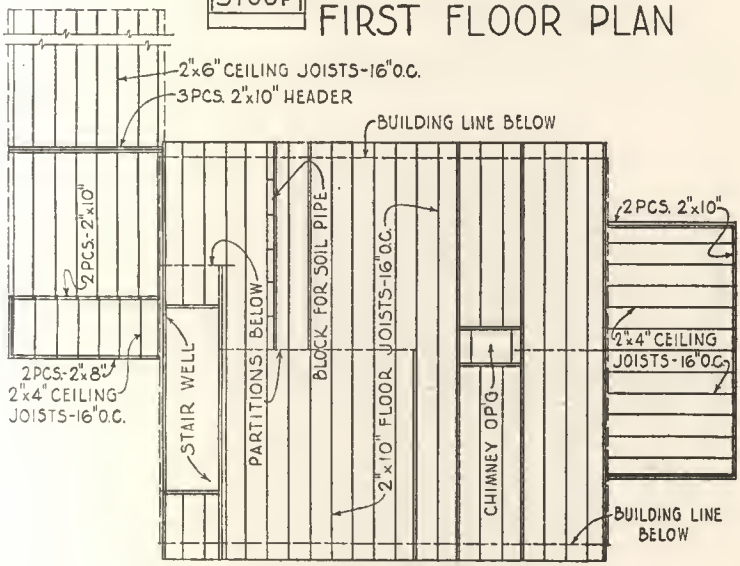



FIRST FLOOR FRAMING

## PLATFORM FRAME CONSTRUCTION

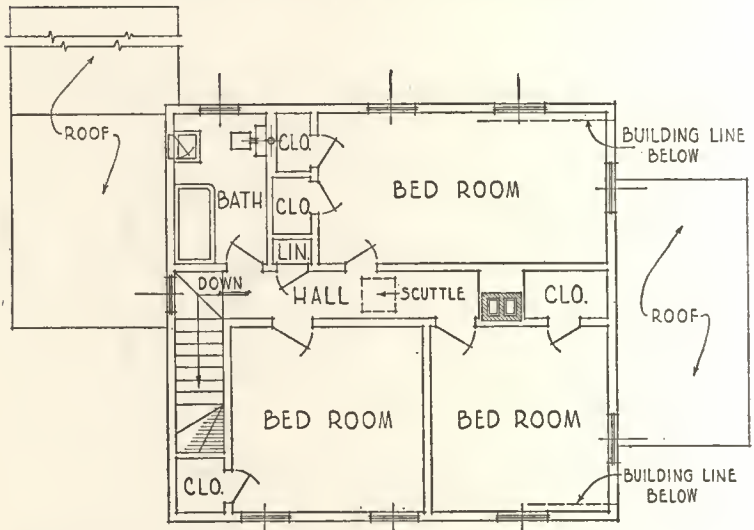



FIRST FLOOR PLAN

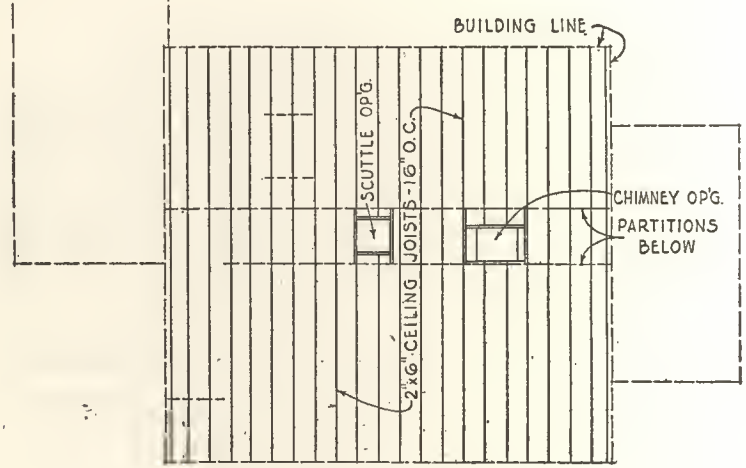



SECOND FLOOR FRAMING

## PLATFORM FRAME CONSTRUCTION

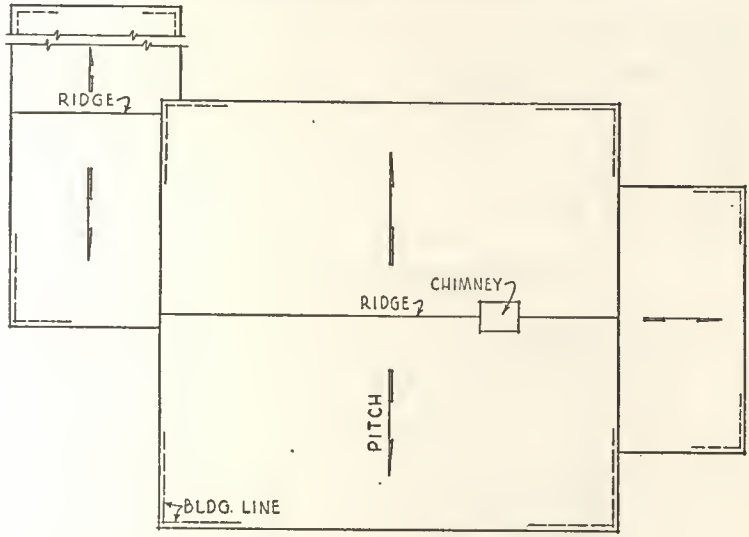



SECOND FLOOR PLAN

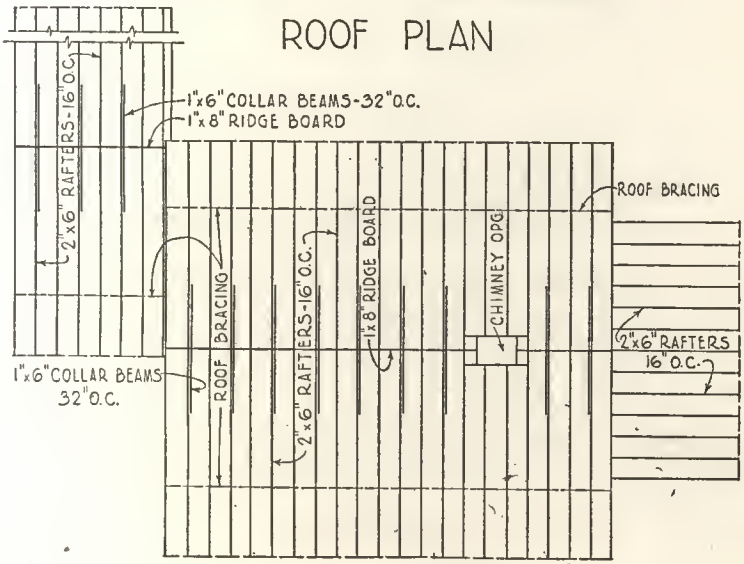



CEILING FRAMING

## PLATFORM FRAME CONSTRUCTION

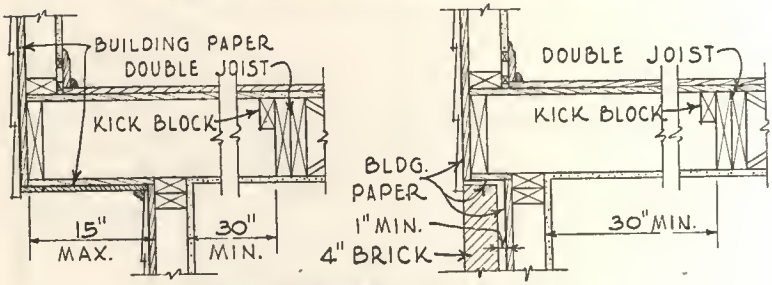



ROOF PLAN

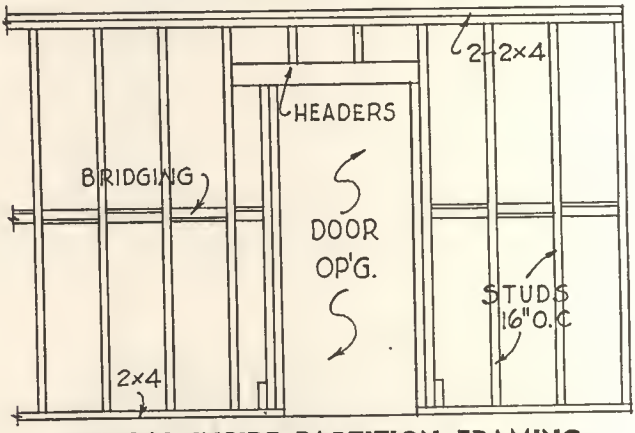



ROOF FRAMING

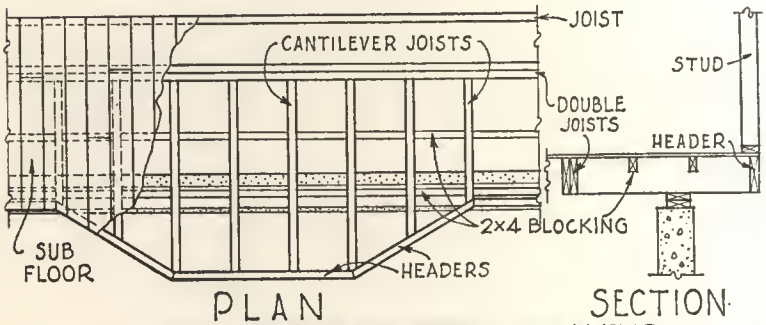
## PLATFORM FRAME CONSTRUCTION




## CANTILEVERED OVERHANG



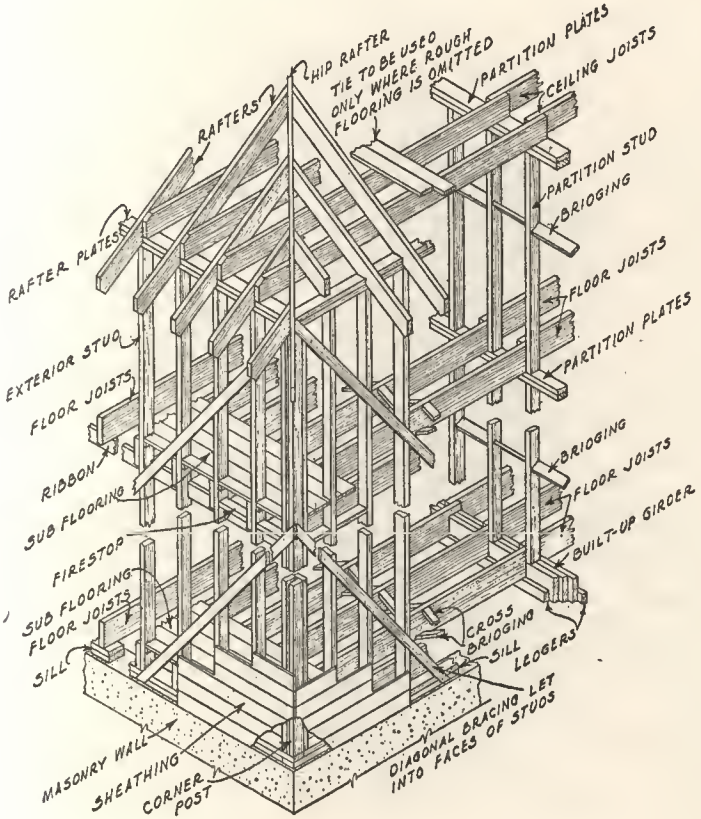

## TYPICAL INSIDE PARTITION FRAMING




## CANTILEVERED BAY WINDOW FRAMING

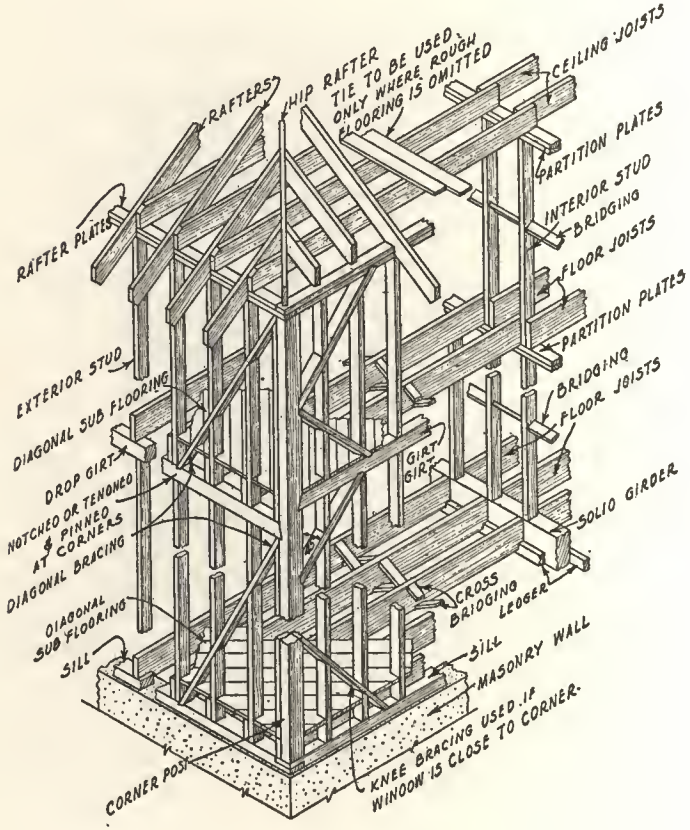
## BALLOON FRAME CONSTRUCTION

The principal characteristic of balloon framing is the extending of studs in one piece from the foundation to the roof, the joists ends being nailed to the studs and also supported by a ribbon or ledger board let into the studs.



## BRACED FRAME CONSTRUCTION

This construction is the outgrowth of the earliest type of frame construction used in this country. It is distinguished by solid sills and corner posts, heavy timber girts at second floor and diagonal knee bracing at corners.



# GENERAL INDEX

## GENERAL INDEX (continued)



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# INDEX

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## INDEX TO DESCRIPTIVE DRAWINGS AND DETAILS (con't.)